April 8, 2016

United States Environmental Protection Agency ("USEPA") Region 1
Water Technical Unit (SMR-04)
5 Post Office Square, Suite 100
Boston, Massachusetts 02109-3912

Re: ***Initial Whole Effluent Toxicity ("WET") Testing***
Veolia Energy North America
Kendall Green Energy LLC
265 First Street
Cambridge, MA 02142
NPDES Permit No. MA0004898

To Whom It May Concern:

AMEC Massachusetts, Inc. ("AMEC"), on behalf of Kendall Green Energy LLC ("Kendall"), is providing this notification of initial WET testing as required in the facility's National Pollutant Discharge Elimination System ("NPDES") permit Effective on February 1, 2011.

Per the requirements of Part I.A. Effluent Limitations and Monitoring Requirements of Kendall's NPDES Permit, WET testing results were as follows:

Acute Toxicity Evaluation

Species	**LC-50 48 Hours**
C. dubia	>100%
P. promelas	>100%

Chronic Toxicity Evaluation

Species	**C-NOEC**
C. dubia	50%
P. promelas	100%

These tests followed the requirements of Attachment C1 for freshwater species due to the salinity of the intake water being less than one part per trillion.

LC_{50} is the concentration of a sample that causes mortality of 50% of the test population at a specific time of observation. So, if the LC_{50} is >100% effluent, less than 50% of the organisms may die from undiluted discharge from the facility. Therefore, an LC_{50} of >100% is the best result achievable for this parameter.

Chronic (Long-term Exposure Test) – No Observed Effect Concentration ("C-NOEC") is the

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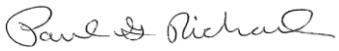
highest tested concentration of an effluent or a toxicant at which no adverse effects are observed on the aquatic test organisms at a specified time of observation. So, if the C-NOEC is >100%, no effects from long term exposure were observed from undiluted discharge from the facility. This is the best result achievable for this parameter. The C-NOEC of 50% shows that some of the organisms **may** have been affected at a 50% concentration of facility discharge. The 50% C-NOEC result is not optimum, but the other results are also taken into consideration when reviewing as a whole. Note, there were some anomalies in this portion of the analysis that may have resulted in the lower C-NOEC. The following anomalies were identified by the testing laboratory:

- C. Dubia was found to be male when it was not reproducing. This was excluded from the statistical analysis
- C. Dubia was missing on test day 2 for the 12.5% test so it was removed from statistical analysis (this seems to be common)
- They failed to meet the testing protocol for MSDp (reproduction). They state that they believe this was due to multiple male C. Dubia and calculated a result that was in range

In AMEC's opinion; the facility is in compliance with pollutants that have permit limits; the LC_{50} of >100% indicates that less than 50% of organisms died from undiluted discharge; the C-NOEC at >100% shows no effect from undiluted discharge; and the C-NOEC at 50% shows there may have been some impact on the organism, but this may have been effected by anomalies in the testing. Therefore, these results appear to be favorable and should be considered a pass by USEPA.

Please feel free to contact me if you have any questions or require any additional information. Thank you for your consideration.

Sincerely,
AMEC Massachusetts, Inc.
By,



Paul G. Richard
Senior Program Director
Phone: 978-392-5328
paul.richard@amecfw.com

Enclosures: ESS Laboratory Work Order #: 1602181

Cc: Sean Caldwell, Veolia
Jim Harrison, Veolia
David Lachance, AMEC

CERTIFICATE OF ANALYSIS

James Harrison
Veolia
265 First Street
Cambridge, MA 02142

RE: NPDES Bioassay (N/A)
ESS Laboratory Work Order Number: 1602181

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.

Laurel Stoddard
Laboratory Director

REVIEWED
By ESS Laboratory at 9:12 am, Apr 12, 2016

Analytical Summary
The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with NELAC Standards, A2LA and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.

Subcontracted Analyses
EnviroSystems, Inc. - Hampton, NH Bioassay

CERTIFICATE OF ANALYSIS

Client Name: Veolia
Client Project ID: NPDES Bioassay

ESS Laboratory Work Order: 1602181

SAMPLE RECEIPT

The following samples were received on February 12, 2016 for the analyses specified on the enclosed Chain of Custody Record.

The sampling for this project was performed by a representative of ESS Laboratory.

The samples and analyses listed below were analyzed in accordance with the Guidelines Establishing Test Procedures for the Analysis of Pollutants, 40 CFR Part 136, as amended.

Samples 1602181-01 and 1602181-02 were received on February 9, 2016.
Samples 1602181-03 and 1602181-04 were recevied on February 11, 2016.

Lab Number	Sample Name	Matrix	Analysis
1602181-01	Final Effluent	Waste Water	120.1, 200.7, 2320B, 2540B, 2540D, 350.1, 5310B, Field, n/a
1602181-02	Receiving Water	Surface Water	120.1, 200.7, 2320B, 2540B, 2540D, 350.1, 5310B, Field
1602181-03	Final Effluent	Waste Water	120.1, 200.7, 2320B, 2540B, 2540D, 350.1, 5310B, Field
1602181-04	Receiving Water	Surface Water	120.1, 200.7, 2320B, 2540B, 2540D, 350.1, 5310B, Field
1602181-05	Final Effluent	Waste Water	120.1, 200.7, 2320B, 2540B, 2540D, 350.1, 5310B, Field
1602181-06	Receiving Water	Surface Water	120.1, 200.7, 2320B, 2540B, 2540D, 350.1, 5310B, Field

CERTIFICATE OF ANALYSIS

Client Name: Veolia
Client Project ID: NPDES Bioassay

ESS Laboratory Work Order: 1602181

PROJECT NARRATIVE

Total Metals
CB61627-BSD1 **Blank Spike recovery is above upper control limit (B+).**
Zinc (118% @ 85-115%)

No other observations noted.

End of Project Narrative.

DATA USABILITY LINKS

Definitions of Quality Control Parameters

Semivolatile Organics Internal Standard Information

Semivolatile Organics Surrogate Information

Volatile Organics Internal Standard Information

Volatile Organics Surrogate Information

EPH and VPH Alkane Lists

CERTIFICATE OF ANALYSIS

Client Name: Veolia
Client Project ID: NPDES Bioassay

ESS Laboratory Work Order: 1602181

CURRENT SW-846 METHODOLOGY VERSIONS

Analytical Methods

1010A - Flashpoint
6010C - ICP
6020A - ICP MS
7010 - Graphite Furnace
7196A - Hexavalent Chromium
7470A - Aqueous Mercury
7471B - Solid Mercury
8011 - EDB/DBCP/TCP
8015D - GRO/DRO
8081B - Pesticides
8082A - PCB
8100M - TPH
8151A - Herbicides
8260B - VOA
8270D - SVOA
8270D SIM - SVOA Low Level
9014 - Cyanide
9038 - Sulfate
9040C - Aqueous pH
9045D - Solid pH (Corrosivity)
9050A - Specific Conductance
9056A - Anions (IC)
9060A - TOC
9095B - Paint Filter
MADEP 04-1.1 - EPH / VPH

Prep Methods

3005A - Aqueous ICP Digestion
3020A - Aqueous Graphite Furnace / ICP MS Digestion
3050B - Solid ICP / Graphite Furnace / ICP MS Digestion
3060A - Solid Hexavalent Chromium Digestion
3510C - Separatory Funnel Extraction
3520C - Liquid / Liquid Extraction
3540C - Manual Soxhlet Extraction
3541 - Automated Soxhlet Extraction
3546 - Microwave Extraction
3580A - Waste Dilution
5030B - Aqueous Purge and Trap
5030C - Aqueous Purge and Trap
5035 - Solid Purge and Trap

SW846 Reactivity Methods 7.3.3.2 (Reactive Cyanide) and 7.3.4.1 (Reactive Sulfide) have been withdrawn by EPA. These methods are reported per client request and are not NELAP accredited.

CERTIFICATE OF ANALYSIS

Client Name: Veolia
Client Project ID: NPDES Bioassay
Client Sample ID: Final Effluent
Date Sampled: 02/08/16 08:00
Percent Solids: N/A

ESS Laboratory Work Order: 1602181
ESS Laboratory Sample ID: 1602181-01
Sample Matrix: Waste Water
Units: mg/L

Extraction Method: 3005A

All methods used are in accordance with 40 CFR 136.

Total Metals

				MA - Permit						
Analyte	**Results (MRL)**	**MDL**	**Method**	**Limit**	**DF**	**Analyst**	**Analyzed**	**I/V**	**F/V**	**Batch**
Aluminum	**0.058** (0.020)		200.7	0.02	1	KJK	02/13/16 1:25	50	10	CB61208
Cadmium	ND (0.0010)		200.7	0.001	1	KJK	02/13/16 1:25	50	10	CB61208
Calcium	**24.5** (0.040)		200.7	0.05	1	KJK	02/13/16 1:25	50	10	CB61208
Chromium	ND (0.004)		200.7	0.005	1	KJK	02/13/16 1:25	50	10	CB61208
Copper	**0.023** (0.002)		200.7	0.0025	1	KJK	02/13/16 1:25	50	10	CB61208
Hardness	**90.8** (0.265)		200.7		1	KJK	02/13/16 1:25	1	1	[CALC]
Lead	ND (0.004)		200.7	0.005	1	KJK	02/13/16 1:25	50	10	CB61208
Magnesium	**7.19** (0.040)		200.7	0.05	1	KJK	02/13/16 1:25	50	10	CB61208
Nickel	ND (0.004)		200.7	0.004	1	KJK	02/13/16 1:25	50	10	CB61208
Zinc	**0.043** (0.010)		200.7	0.0025	1	KJK	02/13/16 1:25	50	10	CB61208

CERTIFICATE OF ANALYSIS

Client Name: Veolia
Client Project ID: NPDES Bioassay
Client Sample ID: Final Effluent
Date Sampled: 02/08/16 08:00
Percent Solids: N/A

ESS Laboratory Work Order: 1602181
ESS Laboratory Sample ID: 1602181-01
Sample Matrix: Waste Water

All methods used are in accordance with 40 CFR 136.

Classical Chemistry

Analyte	Results (MRL)	MDL	Method	MA - Permit Limit	DF	Analyst	Analyzed	Units	Batch
Alkalinity as CaCO3	**31** (2)		2320B	2	1	JLK	02/16/16 19:51	mg/L	CB61639
Ammonia as N	ND (0.10)		350.1	0.1	1	EEM	02/16/16 15:39	mg/L	CB61225
Bioassay	**See Attached** (N/A)								
Conductivity	**1260** (5)		120.1		1	MJV	02/11/16 9:11	umhos/cm	CB61102
Field Dissolved Oxygen	**6.93** (N/A)		Field	1	1	MNM	02/08/16 8:00	mg/L	CB62220
Field pH	**7.45** (N/A)		Field		1	MNM	02/08/16 8:00	S.U.	CB62220
Field Temperature	**21.3** (N/A)		Field		1	MNM	02/08/16 8:00	°C	CB62220
Salinity	**0.700** (N/A)		Field		1	MNM	02/08/16 8:00	S.U.	CB62220
Total Organic Carbon (Average)	**4.8** (1.0)		5310B		1	NAR	02/12/16 0:33	mg/L	[CALC]
Total Residual Chlorine	**0.03** (N/A)		Field	0.05	1	MNM	02/08/16 8:00	mg/L	CB62220
Total Solids	**450** (50)		2540B		1	EEM	02/11/16 16:55	mg/L	CB61119
Total Suspended Solids	**5** (5)		2540D		1	EEM	02/11/16 17:15	mg/L	CB61120

CERTIFICATE OF ANALYSIS

Client Name: Veolia
Client Project ID: NPDES Bioassay
Client Sample ID: Receiving Water
Date Sampled: 02/08/16 10:45
Percent Solids: N/A

ESS Laboratory Work Order: 1602181
ESS Laboratory Sample ID: 1602181-02
Sample Matrix: Surface Water
Units: mg/L

Extraction Method: 3005A

All methods used are in accordance with 40 CFR 136.

Total Metals

				MA - Permit							
Analyte	**Results (MRL)**	**MDL**	**Method**	**Limit**	**DF**	**Analyst**	**Analyzed**	**I/V**	**F/V**	**Batch**
Aluminum	**0.072** (0.020)		200.7	0.02	1	KJK	02/13/16 1:30	50	10	CB61208
Cadmium	ND (0.0010)		200.7	0.001	1	KJK	02/13/16 1:30	50	10	CB61208
Calcium	**25.2** (0.040)		200.7	0.05	1	KJK	02/13/16 1:30	50	10	CB61208
Chromium	**0.006** (0.004)		200.7	0.005	1	KJK	02/13/16 1:30	50	10	CB61208
Copper	**0.004** (0.002)		200.7	0.0025	1	KJK	02/13/16 1:30	50	10	CB61208
Hardness	**95.0** (0.265)		200.7		1	KJK	02/13/16 1:30	1	1	[CALC]
Lead	ND (0.004)		200.7	0.005	1	KJK	02/13/16 1:30	50	10	CB61208
Magnesium	**7.79** (0.040)		200.7	0.05	1	KJK	02/13/16 1:30	50	10	CB61208
Nickel	ND (0.004)		200.7	0.004	1	KJK	02/13/16 1:30	50	10	CB61208
Zinc	**0.046** (0.010)		200.7	0.0025	1	KJK	02/13/16 1:30	50	10	CB61208

CERTIFICATE OF ANALYSIS

Client Name: Veolia
Client Project ID: NPDES Bioassay
Client Sample ID: Receiving Water
Date Sampled: 02/08/16 10:45
Percent Solids: N/A

ESS Laboratory Work Order: 1602181
ESS Laboratory Sample ID: 1602181-02
Sample Matrix: Surface Water

All methods used are in accordance with 40 CFR 136.

Classical Chemistry

Analyte	Results (MRL)	MDL	Method	MA - Permit Limit	DF	Analyst	Analyzed	Units	Batch
Alkalinity as CaCO3	**32** (2)		2320B	2	1	JLK	02/16/16 19:51	mg/L	CB61639
Ammonia as N	**0.26** (0.10)		350.1	0.1	1	EEM	02/16/16 15:42	mg/L	CB61225
Conductivity	**1570** (5)		120.1		1	MJV	02/11/16 9:11	umhos/cm	CB61102
Field Dissolved Oxygen	**11.50** (N/A)		Field	1	1	MNM	02/08/16 10:45	mg/L	CB62220
Field pH	**7.24** (N/A)		Field		1	MNM	02/08/16 10:45	S.U.	CB62220
Field Temperature	**3.2** (N/A)		Field		1	MNM	02/08/16 10:45	°C	CB62220
Salinity	**0.700** (N/A)		Field		1	MNM	02/08/16 10:45	S.U.	CB62220
Total Organic Carbon (Average)	**4.4** (1.0)		5310B		1	NAR	02/12/16 0:45	mg/L	[CALC]
Total Residual Chlorine	**0.05** (N/A)		Field	0.05	1	MNM	02/08/16 10:45	mg/L	CB62220
Total Solids	**570** (50)		2540B		1	EEM	02/11/16 16:55	mg/L	CB61119
Total Suspended Solids	**5** (5)		2540D		1	EEM	02/11/16 17:15	mg/L	CB61120

CERTIFICATE OF ANALYSIS

Client Name: Veolia
Client Project ID: NPDES Bioassay
Client Sample ID: Final Effluent
Date Sampled: 02/10/16 08:15
Percent Solids: N/A

ESS Laboratory Work Order: 1602181
ESS Laboratory Sample ID: 1602181-03
Sample Matrix: Waste Water
Units: mg/L

Extraction Method: 3005A

All methods used are in accordance with 40 CFR 136.

Total Metals

				MA - Permit						
Analyte	**Results (MRL)**	**MDL**	**Method**	**Limit**	**DF**	**Analyst**	**Analyzed**	**I/V**	**F/V**	**Batch**
Aluminum	**0.061** (0.020)		200.7	0.02	1	KJK	02/13/16 1:34	50	10	CB61208
Cadmium	ND (0.0010)		200.7	0.001	1	KJK	02/13/16 1:34	50	10	CB61208
Calcium	**24.8** (0.040)		200.7	0.05	1	KJK	02/13/16 1:34	50	10	CB61208
Chromium	ND (0.004)		200.7	0.005	1	KJK	02/13/16 1:34	50	10	CB61208
Copper	**0.061** (0.002)		200.7	0.0025	1	KJK	02/13/16 1:34	50	10	CB61208
Hardness	**93.5** (0.265)		200.7		1	KJK	02/13/16 1:34	1	1	[CALC]
Lead	**0.004** (0.004)		200.7	0.005	1	KJK	02/13/16 1:34	50	10	CB61208
Magnesium	**7.67** (0.040)		200.7	0.05	1	KJK	02/13/16 1:34	50	10	CB61208
Nickel	ND (0.004)		200.7	0.004	1	KJK	02/13/16 1:34	50	10	CB61208
Zinc	**0.048** (0.010)		200.7	0.0025	1	KJK	02/13/16 1:34	50	10	CB61208

CERTIFICATE OF ANALYSIS

Client Name: Veolia
Client Project ID: NPDES Bioassay
Client Sample ID: Final Effluent
Date Sampled: 02/10/16 08:15
Percent Solids: N/A

ESS Laboratory Work Order: 1602181
ESS Laboratory Sample ID: 1602181-03
Sample Matrix: Waste Water

All methods used are in accordance with 40 CFR 136.

Classical Chemistry

Analyte	Results (MRL)	MDL	Method	MA - Permit Limit	DF	Analyst	Analyzed	Units	Batch
Alkalinity as CaCO3	**31** (2)		2320B	2	1	JLK	02/16/16 19:51	mg/L	CB61639
Ammonia as N	**0.12** (0.10)		350.1	0.1	1	EEM	02/16/16 15:43	mg/L	CB61225
Conductivity	**1570** (5)		120.1		1	MJV	02/16/16 10:27	umhos/cm	CB61603
Field Dissolved Oxygen	**7.00** (N/A)		Field	1	1	MNM	02/10/16 8:15	mg/L	CB62220
Field pH	**7.51** (N/A)		Field		1	MNM	02/10/16 8:15	S.U.	CB62220
Field Temperature	**20.5** (N/A)		Field		1	MNM	02/10/16 8:15	°C	CB62220
Salinity	**0.600** (N/A)		Field		1	MNM	02/10/16 8:15	S.U.	CB62220
Total Organic Carbon (Average)	**5.3** (1.0)		5310B		1	NAR	02/12/16 1:23	mg/L	[CALC]
Total Residual Chlorine	**0.03** (N/A)		Field	0.05	1	MNM	02/10/16 8:15	mg/L	CB62220
Total Solids	**860** (50)		2540B		1	EEM	02/12/16 13:30	mg/L	CB61119
Total Suspended Solids	**5** (5)		2540D		1	EEM	02/12/16 13:30	mg/L	CB61120

CERTIFICATE OF ANALYSIS

Client Name: Veolia
Client Project ID: NPDES Bioassay
Client Sample ID: Receiving Water
Date Sampled: 02/11/16 10:00
Percent Solids: N/A

ESS Laboratory Work Order: 1602181
ESS Laboratory Sample ID: 1602181-04
Sample Matrix: Surface Water
Units: mg/L

Extraction Method: 3005A

All methods used are in accordance with 40 CFR 136.

Total Metals

Analyte	Results (MRL)	MDL	Method	MA - Permit Limit	DF	Analyst	Analyzed	I/V	F/V	Batch
Aluminum	**0.062** (0.020)		200.7	0.02	1	KJK	02/13/16 1:38	100	20	CB61208
Cadmium	ND (0.0010)		200.7	0.001	1	KJK	02/13/16 1:38	100	20	CB61208
Calcium	**23.2** (0.040)		200.7	0.05	1	KJK	02/13/16 1:38	100	20	CB61208
Chromium	ND (0.004)		200.7	0.005	1	KJK	02/13/16 1:38	100	20	CB61208
Copper	**0.003** (0.002)		200.7	0.0025	1	KJK	02/13/16 1:38	100	20	CB61208
Hardness	**86.9** (0.265)		200.7		1	KJK	02/13/16 1:38	1	1	[CALC]
Lead	ND (0.004)		200.7	0.005	1	KJK	02/13/16 1:38	100	20	CB61208
Magnesium	**7.06** (0.040)		200.7	0.05	1	KJK	02/13/16 1:38	100	20	CB61208
Nickel	ND (0.004)		200.7	0.004	1	KJK	02/13/16 1:38	100	20	CB61208
Zinc	**0.035** (0.010)		200.7	0.0025	1	KJK	02/13/16 1:38	100	20	CB61208

CERTIFICATE OF ANALYSIS

Client Name: Veolia
Client Project ID: NPDES Bioassay
Client Sample ID: Receiving Water
Date Sampled: 02/11/16 10:00
Percent Solids: N/A

ESS Laboratory Work Order: 1602181
ESS Laboratory Sample ID: 1602181-04
Sample Matrix: Surface Water

All methods used are in accordance with 40 CFR 136.

Classical Chemistry

Analyte	Results (MRL)	MDL	Method	MA - Permit Limit	DF	Analyst	Analyzed	Units	Batch
Alkalinity as CaCO3	**30** (2)		2320B	2	1	JLK	02/16/16 19:51	mg/L	CB61639
Ammonia as N	**0.16** (0.10)		350.1	0.1	1	EEM	02/16/16 15:43	mg/L	CB61225
Conductivity	**1480** (5)		120.1		1	MJV	02/16/16 10:27	umhos/cm	CB61603
Field Dissolved Oxygen	**10.10** (N/A)		Field	1	1	MNM	02/11/16 10:00	mg/L	CB62220
Field pH	**7.32** (N/A)		Field		1	MNM	02/11/16 10:00	S.U.	CB62220
Field Temperature	**3.0** (N/A)		Field		1	MNM	02/11/16 10:00	°C	CB62220
Salinity	**0.600** (N/A)		Field		1	MNM	02/11/16 10:00	S.U.	CB62220
Total Organic Carbon (Average)	**4.1** (1.0)		5310B		1	NAR	02/12/16 1:35	mg/L	[CALC]
Total Residual Chlorine	**0.06** (N/A)		Field	0.05	1	MNM	02/11/16 10:00	mg/L	CB62220
Total Solids	**800** (50)		2540B		1	EEM	02/12/16 13:30	mg/L	CB61119
Total Suspended Solids	ND (5)		2540D		1	EEM	02/12/16 13:30	mg/L	CB61120

CERTIFICATE OF ANALYSIS

Client Name: Veolia
Client Project ID: NPDES Bioassay
Client Sample ID: Final Effluent
Date Sampled: 02/12/16 10:30
Percent Solids: N/A

ESS Laboratory Work Order: 1602181
ESS Laboratory Sample ID: 1602181-05
Sample Matrix: Waste Water
Units: mg/L

Extraction Method: 3005A

All methods used are in accordance with 40 CFR 136.

Total Metals

				MA - Permit						
Analyte	**Results (MRL)**	**MDL**	**Method**	**Limit**	**DF**	**Analyst**	**Analyzed**	**I/V**	**F/V**	**Batch**
Aluminum	**0.101** (0.020)		200.7	0.02	1	JP	02/17/16 4:17	50	10	CB61627
Cadmium	ND (0.0010)		200.7	0.001	1	JP	02/17/16 4:17	50	10	CB61627
Calcium	**26.3** (0.040)		200.7	0.05	1	JP	02/17/16 4:17	50	10	CB61627
Chromium	ND (0.004)		200.7	0.005	1	JP	02/17/16 4:17	50	10	CB61627
Copper	**0.105** (0.002)		200.7	0.0025	1	JP	02/17/16 4:17	50	10	CB61627
Hardness	**100** (0.265)		200.7		1	JP	02/17/16 4:17	1	1	[CALC]
Lead	**0.012** (0.004)		200.7	0.005	1	JP	02/17/16 4:17	50	10	CB61627
Magnesium	**8.42** (0.040)		200.7	0.05	1	JP	02/17/16 4:17	50	10	CB61627
Nickel	ND (0.004)		200.7	0.004	1	JP	02/17/16 4:17	50	10	CB61627
Zinc	**0.068** (0.010)		200.7	0.0025	1	JP	02/17/16 4:17	50	10	CB61627

CERTIFICATE OF ANALYSIS

Client Name: Veolia
Client Project ID: NPDES Bioassay
Client Sample ID: Final Effluent
Date Sampled: 02/12/16 10:30
Percent Solids: N/A

ESS Laboratory Work Order: 1602181
ESS Laboratory Sample ID: 1602181-05
Sample Matrix: Waste Water

All methods used are in accordance with 40 CFR 136.

Classical Chemistry

Analyte	Results (MRL)	MDL	Method	MA - Permit Limit	DF	Analyst	Analyzed	Units	Batch
Alkalinity as CaCO3	**30** (2)		2320B	2	1	JLK	02/16/16 19:51	mg/L	CB61639
Ammonia as N	ND (0.10)		350.1	0.1	1	EEM	02/22/16 12:01	mg/L	CB61934
Conductivity	**1620** (5)		120.1		1	MJV	02/16/16 10:27	umhos/cm	CB61603
Field Dissolved Oxygen	**7.78** (N/A)		Field	1	1	MNM	02/12/16 10:30	mg/L	CB62220
Field pH	**7.46** (N/A)		Field		1	MNM	02/12/16 10:30	S.U.	CB62220
Field Temperature	**10.5** (N/A)		Field		1	MNM	02/12/16 10:30	°C	CB62220
Salinity	**0.800** (N/A)		Field		1	MNM	02/12/16 10:30	S.U.	CB62220
Total Organic Carbon (Average)	**6.5** (1.0)		5310B		1	DEL	02/18/16 0:44	mg/L	[CALC]
Total Residual Chlorine	**0.18** (N/A)		Field	0.05	1	MNM	02/12/16 10:30	mg/L	CB62220
Total Solids	**750** (50)		2540B		1	EEM	02/17/16 16:30	mg/L	CB61721
Total Suspended Solids	**5** (5)		2540D		1	EEM	02/17/16 16:45	mg/L	CB61722

CERTIFICATE OF ANALYSIS

Client Name: Veolia
Client Project ID: NPDES Bioassay
Client Sample ID: Receiving Water
Date Sampled: 02/12/16 10:05
Percent Solids: N/A

ESS Laboratory Work Order: 1602181
ESS Laboratory Sample ID: 1602181-06
Sample Matrix: Surface Water
Units: mg/L

Extraction Method: 3005A

All methods used are in accordance with 40 CFR 136.

Total Metals

				MA - Permit						
Analyte	**Results (MRL)**	**MDL**	**Method**	**Limit**	**DF**	**Analyst**	**Analyzed**	**I/V**	**F/V**	**Batch**
Aluminum	**0.071** (0.020)		200.7	0.02	1	JP	02/17/16 4:21	50	10	CB61627
Cadmium	ND (0.0010)		200.7	0.001	1	JP	02/17/16 4:21	50	10	CB61627
Calcium	**23.8** (0.040)		200.7	0.05	1	JP	02/17/16 4:21	50	10	CB61627
Chromium	ND (0.004)		200.7	0.005	1	JP	02/17/16 4:21	50	10	CB61627
Copper	**0.003** (0.002)		200.7	0.0025	1	JP	02/17/16 4:21	50	10	CB61627
Hardness	**91.8** (0.265)		200.7		1	JP	02/17/16 4:21	1	1	[CALC]
Lead	ND (0.004)		200.7	0.005	1	JP	02/17/16 4:21	50	10	CB61627
Magnesium	**7.87** (0.040)		200.7	0.05	1	JP	02/17/16 4:21	50	10	CB61627
Nickel	ND (0.004)		200.7	0.004	1	JP	02/17/16 4:21	50	10	CB61627
Zinc	**0.048** (0.010)		200.7	0.0025	1	JP	02/17/16 4:21	50	10	CB61627

CERTIFICATE OF ANALYSIS

Client Name: Veolia
Client Project ID: NPDES Bioassay
Client Sample ID: Receiving Water
Date Sampled: 02/12/16 10:05
Percent Solids: N/A

ESS Laboratory Work Order: 1602181
ESS Laboratory Sample ID: 1602181-06
Sample Matrix: Surface Water

All methods used are in accordance with 40 CFR 136.

Classical Chemistry

Analyte	Results (MRL)	MDL	Method	MA - Permit Limit	DF	Analyst	Analyzed	Units	Batch
Alkalinity as CaCO3	**31** (2)		2320B	2	1	JLK	02/16/16 19:51	mg/L	CB61639
Ammonia as N	**0.17** (0.10)		350.1	0.1	1	EEM	02/22/16 12:02	mg/L	CB61934
Conductivity	**1750** (5)		120.1		1	MJV	02/16/16 10:27	umhos/cm	CB61603
Field Dissolved Oxygen	**11.21** (N/A)		Field	1	1	MNM	02/12/16 10:05	mg/L	CB62220
Field pH	**7.82** (N/A)		Field		1	MNM	02/12/16 10:05	S.U.	CB62220
Field Temperature	**1.2** (N/A)		Field		1	MNM	02/12/16 10:05	°C	CB62220
Salinity	**0.800** (N/A)		Field		1	MNM	02/12/16 10:05	S.U.	CB62220
Total Organic Carbon (Average)	**5.2** (1.0)		5310B		1	DEL	02/18/16 21:12	mg/L	[CALC]
Total Residual Chlorine	**0.20** (N/A)		Field	0.05	1	MNM	02/12/16 10:05	mg/L	CB62220
Total Solids	**860** (50)		2540B		1	EEM	02/17/16 16:30	mg/L	CB61721
Total Suspended Solids	**5** (5)		2540D		1	EEM	02/17/16 16:45	mg/L	CB61722

CERTIFICATE OF ANALYSIS

Client Name: Veolia
Client Project ID: NPDES Bioassay

ESS Laboratory Work Order: 1602181

Quality Control Data

Total Metals

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch CB61208 - 3005A										
Blank										
Aluminum	ND	0.020	mg/L							
Cadmium	ND	0.0010	mg/L							
Calcium	ND	0.040	mg/L							
Calcium	ND	0.040	mg/L							
Chromium	ND	0.004	mg/L							
Copper	ND	0.002	mg/L							
Hardness	ND	0.265	mg/L							
Lead	ND	0.004	mg/L							
Magnesium	ND	0.040	mg/L							
Magnesium	ND	0.040	mg/L							
Nickel	ND	0.004	mg/L							
Zinc	ND	0.010	mg/L							
LCS										
Aluminum	0.523	0.020	mg/L	0.5000		105	85-115			
Cadmium	0.0486	0.0010	mg/L	0.05000		97	85-115			
Calcium	1.01	0.040	mg/L	1.000		101	85-115			
Calcium	1.01	0.040	mg/L	1.000		101	85-115			
Chromium	0.103	0.004	mg/L	0.1000		103	85-115			
Copper	0.107	0.002	mg/L	0.1000		107	85-115			
Hardness	6.89	0.265	mg/L							
Lead	0.101	0.004	mg/L	0.1000		101	85-115			
Magnesium	1.06	0.040	mg/L	1.000		106	85-115			
Magnesium	1.06	0.040	mg/L	1.000		106	85-115			
Nickel	0.101	0.004	mg/L	0.1000		101	85-115			
Zinc	0.102	0.010	mg/L	0.1000		102	85-115			
LCS Dup										
Aluminum	0.507	0.020	mg/L	0.5000		101	85-115	3	20	
Cadmium	0.0478	0.0010	mg/L	0.05000		96	85-115	2	20	
Calcium	0.994	0.040	mg/L	1.000		99	85-115	2	20	
Calcium	0.994	0.040	mg/L	1.000		99	85-115	2	20	
Chromium	0.101	0.004	mg/L	0.1000		101	85-115	3	20	
Copper	0.104	0.002	mg/L	0.1000		104	85-115	3	20	
Hardness	6.75	0.265	mg/L							
Lead	0.101	0.004	mg/L	0.1000		101	85-115	0.7	20	
Magnesium	1.04	0.040	mg/L	1.000		104	85-115	3	20	
Magnesium	1.04	0.040	mg/L	1.000		104	85-115	3	20	
Nickel	0.098	0.004	mg/L	0.1000		98	85-115	3	20	
Zinc	0.099	0.010	mg/L	0.1000		99	85-115	3	20	
Batch CB61627 - 3005A										
Blank										
Aluminum	ND	0.020	mg/L							
Cadmium	ND	0.0010	mg/L							
Calcium	ND	0.040	mg/L							

CERTIFICATE OF ANALYSIS

Client Name: Veolia
Client Project ID: NPDES Bioassay

ESS Laboratory Work Order: 1602181

Quality Control Data

Total Metals

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch CB61627 - 3005A										
Calcium	ND	0.040	mg/L							
Chromium	ND	0.004	mg/L							
Copper	ND	0.002	mg/L							
Hardness	ND	0.265	mg/L							
Lead	ND	0.004	mg/L							
Magnesium	ND	0.040	mg/L							
Magnesium	ND	0.040	mg/L							
Nickel	ND	0.004	mg/L							
Zinc	ND	0.010	mg/L							
Blank										
Copper	ND	0.010	mg/L							
Blank										
Aluminum	ND	0.100	mg/L							
Copper	ND	0.020	mg/L							
Lead	ND	0.020	mg/L							
Zinc	ND	0.050	mg/L							
LCS										
Aluminum	0.557	0.020	mg/L	0.5000		111	85-115			
Cadmium	0.0526	0.0010	mg/L	0.05000		105	85-115			
Calcium	1.06	0.040	mg/L	1.000		106	85-115			
Calcium	1.06	0.040	mg/L	1.000		106	85-115			
Chromium	0.109	0.004	mg/L	0.1000		109	85-115			
Copper	0.107	0.002	mg/L	0.1000		107	85-115			
Hardness	7.06	0.265	mg/L							
Lead	0.111	0.004	mg/L	0.1000		111	85-115			
Magnesium	1.07	0.040	mg/L	1.000		107	85-115			
Magnesium	1.07	0.040	mg/L	1.000		107	85-115			
Nickel	0.114	0.004	mg/L	0.1000		114	85-115			
Zinc	0.112	0.010	mg/L	0.1000		112	85-115			
LCS										
Copper	0.249	0.010	mg/L	0.2500		100	85-115			
LCS										
Aluminum	2.69	0.100	mg/L	2.500		108	85-115			
Copper	0.521	0.020	mg/L	0.5000		104	85-115			
Lead	0.530	0.020	mg/L	0.5000		106	85-115			
Zinc	0.529	0.050	mg/L	0.5000		106	85-115			
LCS Dup										
Aluminum	0.541	0.020	mg/L	0.5000		108	85-115	3	20	
Cadmium	0.0508	0.0010	mg/L	0.05000		102	85-115	3	20	
Calcium	1.01	0.040	mg/L	1.000		101	85-115	5	20	
Calcium	1.01	0.040	mg/L	1.000		101	85-115	5	20	
Chromium	0.105	0.004	mg/L	0.1000		105	85-115	4	20	
Copper	0.104	0.002	mg/L	0.1000		104	85-115	3	20	
Hardness	6.77	0.265	mg/L							

CERTIFICATE OF ANALYSIS

Client Name: Veolia
Client Project ID: NPDES Bioassay

ESS Laboratory Work Order: 1602181

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Total Metals										
Batch CB61627 - 3005A										
Lead	0.106	0.004	mg/L	0.1000		106	85-115	4	20	
Magnesium	1.03	0.040	mg/L	1.000		103	85-115	4	20	
Magnesium	1.03	0.040	mg/L	1.000		103	85-115	4	20	
Nickel	0.109	0.004	mg/L	0.1000		109	85-115	4	20	
Zinc	0.118	0.010	mg/L	0.1000		118	85-115	5	20	B+
LCS Dup										
Copper	0.244	0.010	mg/L	0.2500		97	85-115	2	20	
LCS Dup										
Aluminum	2.73	0.100	mg/L	2.500		109	85-115	2	20	
Copper	0.532	0.020	mg/L	0.5000		106	85-115	2	20	
Lead	0.539	0.020	mg/L	0.5000		108	85-115	2	20	
Zinc	0.543	0.050	mg/L	0.5000		109	85-115	3	20	
Classical Chemistry										
Batch CB61102 - General Preparation										
Blank										
Conductivity	ND	5	umhos/cm							
LCS										
Conductivity	1390		umhos/cm	1411		98	90-110			
Batch CB61119 - General Preparation										
Blank										
Total Solids	ND	10	mg/L							
LCS										
Total Solids	310		mg/L	324.0		96	80-120			
Batch CB61120 - General Preparation										
Blank										
Total Suspended Solids	ND	5	mg/L							
LCS										
Total Suspended Solids	44		mg/L	42.10		105	80-120			
Batch CB61138 - General No Prep										
Blank										
Total Organic Carbon (1)	ND	1.0	mg/L							
Total Organic Carbon (2)	ND	1.0	mg/L							
Total Organic Carbon (Average)	ND	1.0	mg/L							
LCS										
Total Organic Carbon (1)	4.79	1.0	mg/L	5.000		96	80-120			
Total Organic Carbon (2)	4.79	1.0	mg/L	5.000		96	80-120			
Total Organic Carbon (Average)	4.80	1.0	mg/L							
LCS Dup										
Total Organic Carbon (1)	4.81	1.0	mg/L	5.000		96	80-120	0.4	200	
Total Organic Carbon (2)	4.81	1.0	mg/L	5.000		96	80-120	0.4	200	
Total Organic Carbon (Average)	4.80	1.0	mg/L							

CERTIFICATE OF ANALYSIS

Client Name: Veolia
Client Project ID: NPDES Bioassay

ESS Laboratory Work Order: 1602181

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Classical Chemistry										
Batch CB61225 - NH4 Prep										
Blank										
Ammonia as N	ND	0.10	mg/L							
LCS										
Ammonia as N	0.11	0.10	mg/L	0.09994		114	80-120			
LCS										
Ammonia as N	0.95	0.10	mg/L	0.9994		95	80-120			
Batch CB61603 - General Preparation										
Blank										
Conductivity	ND	5	umhos/cm							
LCS										
Conductivity	1350		umhos/cm	1411		96	90-110			
Batch CB61639 - General Preparation										
Blank										
Alkalinity as CaCO3	ND	10	mg/L							
LCS										
Alkalinity as CaCO3	81		mg/L	78.30		103	85-115			
Batch CB61721 - General Preparation										
Blank										
Total Solids	ND	10	mg/L							
LCS										
Total Solids	310		mg/L	324.0		96	80-120			
Batch CB61722 - General Preparation										
Blank										
Total Suspended Solids	ND	5	mg/L							
LCS										
Total Suspended Solids	44		mg/L	42.10		105	80-120			
Batch CB61758 - General Preparation										
Blank										
Total Organic Carbon (1)	ND	1.0	mg/L							
Total Organic Carbon (2)	ND	1.0	mg/L							
Total Organic Carbon (Average)	ND	1.0	mg/L							
LCS										
Total Organic Carbon (1)	5.46	1.0	mg/L	5.000		109	80-120			
Total Organic Carbon (2)	5.45	1.0	mg/L	5.000		109	80-120			
Total Organic Carbon (Average)	5.50	1.0	mg/L							
LCS Dup										
Total Organic Carbon (1)	5.35	1.0	mg/L	5.000		107	80-120	2	200	
Total Organic Carbon (2)	5.33	1.0	mg/L	5.000		107	80-120	2	200	
Total Organic Carbon (Average)	5.30	1.0	mg/L							
Batch CB61934 - NH4 Prep										

CERTIFICATE OF ANALYSIS

Client Name: Veolia
Client Project ID: NPDES Bioassay

ESS Laboratory Work Order: 1602181

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Classical Chemistry										
Batch CB61934 - NH4 Prep										
Blank										
Ammonia as N	ND	0.10	mg/L							
LCS										
Ammonia as N	0.08	0.10	mg/L	0.09994		81	80-120			
LCS										
Ammonia as N	0.93	0.10	mg/L	0.9994		93	80-120			

CERTIFICATE OF ANALYSIS

Client Name: Veolia
Client Project ID: NPDES Bioassay

ESS Laboratory Work Order: 1602181

Notes and Definitions

Z-08	See Attached
U	Analyte included in the analysis, but not detected
B+	Blank Spike recovery is above upper control limit (B+).
ND	Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
DL	Detection Limit
I/V	Initial Volume
F/V	Final Volume
§	Subcontracted analysis; see attached report
1	Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
2	Range result excludes concentrations of target analytes eluting in that range.
3	Range result excludes the concentration of the C9-C10 aromatic range.
Avg	Results reported as a mathematical average.
NR	No Recovery
[CALC]	Calculated Analyte
SUB	Subcontracted analysis; see attached report

CERTIFICATE OF ANALYSIS

Client Name: Veolia
Client Project ID: NPDES Bioassay

ESS Laboratory Work Order: 1602181

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

ENVIRONMENTAL

Rhode Island Potable and Non Potable Water: LAI00179
http://www.health.ri.gov/find/labs/analytical/ESS.pdf

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750
http://www.ct.gov/dph/lib/dph/environmental_health/environmental_laboratories/pdf/OutofStateCommercialLaboratories.pdf

Maine Potable and Non Potable Water, and Solid and Hazardous Waste: RI00002
http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/documents/AllLabs.xls

Massachusetts Potable and Non Potable Water: M-RI002
http://public.dep.state.ma.us/Labcert/Labcert.aspx

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 2424
http://des.nh.gov/organization/divisions/water/dwgb/nhelap/index.htm

New York (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: 11313
http://www.wadsworth.org/labcert/elap/comm.html

New Jersey (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: RI006
http://datamine2.state.nj.us/DEP_OPRA/OpraMain/pi_main?mode=pi_by_site&sort_order=PI_NAMEA&Select+a+Site:=58715

United States Department of Agriculture Soil Permit: P330-12-00139

Pennsylvania: 68-01752
http://www.depweb.state.pa.us/portal/server.pt/community/labs/13780/laboratory_accreditation_program/590095

ESI

EnviroSystems, Inc.
P.O. Box 778
Hampton, NH 03843-0778
603-926-3345

April 11, 2016

Mr. Joe Sirbak
ESS Laboratories
185 Frances Avenue
Cranston, Rhode Island 02910

Dear Mr. Sirbak:

Enclosed, please find a copy of our revised report evaluating the toxicity of effluent samples collected from the Kendall Green Energy Facility located in Cambridge, Massachusetts during February 2016. Acute and chronic toxicity was evaluated using the freshwater species, *Ceriodaphnia dubia* and *Pimephales promelas*.

The report has been revised to correct an error in Table 1 identifying an incorrect receiving water source.

Please do not hesitate to call me or Petra Karbe should you have any questions regarding the report.

Sincerely,

EnviroSystems, Incorporated

Kirk Cram
Toxicology Laboratory Manager

Enclosure
WET Test Report Certification
WET Test Report Number 27001-16-02 Rev. 1
One (1) Copy (email only)

cc: Mr. Matt Miller (email only)
Ms. Michelle Mirenda (email only)
Mr. Shawn Morrell (email only)

WHOLE EFFLUENT TOXICITY TEST REPORT CERTIFICATION

Permittee Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Executed on: 4/13/16

Authorized Signature

R. Scott McBurney

Print or Type Name

Kendall Green Energy, LLC

Print or Type the Permittee's Name

MA0004898

Type or Print the NPDES Permit No.

WHOLE EFFLUENT TOXICITY TEST REPORT CERTIFICATION (Bioassay Laboratory)

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Executed on: March 16, 2016

Kirk Cram
Toxicology Laboratory Manager - EnviroSystems, Inc.

TOXICOLOGICAL EVALUATION
OF A POWER PLANT EFFLUENT
BIOMONITORING SUPPORT FOR A NPDES PERMIT:
February 2016

Kendall Green Energy Facility
Cambridge, Massachusetts
NPDES Permit Number MA0004898

Prepared For:

ESS Laboratories
185 Frances Avenue
Cranston, Rhode Island 02910

Prepared By:

EnviroSystems, Incorporated
One Lafayette Road
Hampton, New Hampshire 03842

February 2016
Reference Number: ESS-Kendall27001-16-02 Rev. 1

STUDY NUMBER 27001

EXECUTIVE SUMMARY

The following summarizes the results of modified acute and chronic exposure bioassays completed during February 2016 to support the NPDES biomonitoring requirements of the Kendall Green Energy Facility located in Cambridge, Massachusetts. Samples were provided by ESS Laboratories, Cranston, Rhode Island. Acute and chronic exposure toxicity were evaluated using the freshwater species, *Ceriodaphnia dubia* and *Pimephales promelas*.

C. dubia, cultured at ESI, were <24 hours old juveniles released within 8 hours of one another. *P. promelas*, supplied by Aquatic BioSystems, Inc. of Fort Collins, Colorado, were <48 hours old at the start of the assay. Dilution water was receiving water collected from the Charles River upstream of the point of discharge. Samples were received under chain of custody in good order. All sample receipt, test conditions and control endpoints were within protocol specifications, except where otherwise noted.

The results presented in this report relate only to the samples described on the chain(s) of custody and sample receipt log(s), and are intended to be used only by the submitter. Results from the modified acute and chronic exposure assays and their relationship to permit limits are summarized in the following matrix.

Acute Toxicity Evaluation

Species	Exposure	LC-50	A-NOEC	Permit Limit (LC-50)	Effluent Meets Permit Limit	Assay Meets Protocol Limits
Ceriodaphnia dubia	48 Hours	>100%	NC	Report	NA	Yes
Pimephales promelas	48 Hours	>100%	NC	Report	NA	Yes

Chronic Toxicity Evaluation

Species	Exposure	C-NOEC	IC-25	Permit Limit (C-NOEC)	Effluent Meets Permit Limit	Assay Meets Protocol Limits
Ceriodaphnia dubia [a, b]	7 Days	50% [c]	68.5% [c]	Report	NA	Yes [c]
Pimephales promelas [d]	7 Days	100%	NC	Report	NA	Yes

COMMENTS:
NC = Not Calculated.
[a] Replicate H of the 25% test concentration was removed from the statistical analysis for reproduction and calculation of brood production, but retained for the statistical analysis for survival because the daphnid was identified as male.
[b] Replicate I of the 12.5% test concentration was removed from statistical analyses because the daphnid was missing on test day 2.
[c] The daphnid assay failed to meet the protocol specified statistical variability limit (MSDp) for reproduction. The MSDp was computed to be 51.1%, which exceeds US EPA's acceptable range of 13% - 47% specified by the method protocol, suggesting that the assay is not sensitive enough to detect a significant difference at the permit limit via hypothesis testing. The data generally follow an inverse dose-response, with the greatest impact on reproduction observed in both the receiving water diluent control and in the 100% test concentration, which is not affected by the diluent and therefore indicative of an adverse response. These concentrations also displayed the highest variability among replicates. The calculated IC-25 for reproduction of 68.5% supports a C-NOEC of 50%. Further review revealed that replicate H produced no broods in either control or any test concentrations, and was identified as male in the 25% test concentration. Suspecting that all H replicates were male, an alternative statistical analysis of the reproduction data was completed that removed all H replicates. The alternative analysis resulted in a calculated C-NOEC of 50% and an MSDp of

25.1%, which falls within the US EPA's acceptable range. Based on these findings these data are considered provisionally valid and a C-NOEC of 50% is considered representative of the data.
[d] Replicate C of the laboratory non-diluent control had one fish unaccounted for on test day 7, therefore only 9 organisms were used from the start of the assay in this replicate for the statistical analyses.

TOXICOLOGICAL EVALUATION
OF A POWER PLANT EFFLUENT
BIOMONITORING SUPPORT FOR A NPDES PERMIT:
February 2016

Kendall Green Energy Facility
Cambridge, Massachusetts
NPDES Permit Number MA0004898

1.0 INTRODUCTION

This report presents the results of toxicity tests completed on a series of composite effluent samples collected from the Kendall Green Energy Facility located in Cambridge, Massachusetts. Samples were provided by ESS Laboratories, Cranston, Rhode Island. Testing was based on programs and protocols developed by the US EPA (2002), with exceptions as noted by US EPA Region I (2011, 2013), and involved conducting modified acute and chronic toxicity tests with the freshwater species, *Ceriodaphnia dubia* and *Pimephales promelas*. Testing was performed at EnviroSystems, Incorporated (ESI), Hampton, New Hampshire in accordance with the provisions of TNI Standards (2009).

Acute toxicity tests involve preparing a series of test concentrations by diluting test samples with control water. Groups of test organisms are exposed to each test concentration and a control for a specified period. The mortality data for each concentration can be used to calculate (by regression) the median lethal concentration or LC-50, defined as the concentration of effluent that kills half of the test organisms. Samples with a high LC-50 value are less likely to cause significant environmental impacts. These data can also be analyzed to determine the no effect level. This Acute No Observed Effect Concentration (A-NOEC) is defined as the highest tested effluent concentration that causes no significant mortality. Chronic toxicity tests measure sublethal effects, exposing test organisms to samples during a sensitive period in the life cycle. Minnow chronic tests measure survival and growth (weight) during the first seven days post hatch; daphnid chronic tests measure survival and juvenile production. Using Analysis of Variance techniques to evaluate the data, it is possible to determine the lowest tested concentration that had an effect (C-LOEC) and the highest tested concentration where no effect (C-NOEC) was observed.

2.0 MATERIALS AND METHODS

2.1 General Methods

Toxicological and analytical protocols used in this program follow procedures primarily designed to provide standard approaches for the evaluation of toxicological effects of discharges on aquatic organisms (US EPA 2002), and for the analysis of water samples (APHA 2012). See Section 4.0 for a list of references.

2.2 Test Species

C. dubia were maintained in laboratory water at 25±1°C with a photoperiod of 16:8 hours light:dark. Cultures are fed daily with a yeast/trout chow/Cerophyll or alfalfa leaves (YTC) mixture supplemented with *Pseudokirchneriella subcapitata* (algae) (US EPA 2002). Adults on a brood board were isolated 24 hours prior to test start and allowed to reproduce for 8 hours.

When necessary, *P. promelas* were acclimated to approximate test conditions prior to use in the assay. Organisms were transferred to test chambers using an inverted glass pipette, minimizing the amount of water added to the test solution.

2.3 Effluent, Receiving Water and Laboratory Water

Effluent and receiving water collection information is provided in Table 1. Samples were received at 0-6°C as per 40 CFR §136.3 unless otherwise noted, stored at 4±2°C and warmed to 25±1°C prior to preparing test solutions. Laboratory water was synthetic reconstituted water prepared at ESI according to protocol (US EPA 2002). This water has been used to successfully culture freshwater organisms since 1992.

Total residual chlorine (TRC) was measured by amperometric titration (MDL 0.02 mg/L) in the effluent samples prior to use in the assays. Samples with ≥0.02 mg/L TRC were dechlorinated using sodium thiosulfate (US EPA 2002).

2.4 Chronic Exposure Bioassays

The chronic exposure bioassays were conducted according to protocol (US EPA 2002), which called for the daily renewal of test solutions. Test treatments were 100% (undiluted), 50%, 25%, 12.5%, and 6.25% effluent. Dissolved oxygen, pH, temperature, and specific conductivity were measured in one replicate of each new test solution.

Test chambers for the daphnid assay were 30 mL portion cups containing approximately 20 mL of test solution in each of 10 replicates with 1 organism/replicate. Replicates were not randomized during testing; rather, organisms were added at test initiation by blocking by known parentage. Survival and juvenile production were monitored daily. Daphnids were each fed 200 µL of YTC supplemented with algae after daily renewals.

Test chambers for the fathead minnow assay were 400-600 mL beakers with 250 mL of solution in each of 4 replicates containing 10 organisms/replicate. Replicates were not randomized during testing; rather, organisms were added randomly at test initiation by replicate across test solutions in an alternating fashion (alternating allocation). Prior to daily renewals, survival and dissolved oxygen were measured in all replicates, and pH, temperature and specific conductivity were measured in one replicate of each concentration. Fish were fed newly hatched *Artemia* nauplii daily. Dead nauplii from previous feedings were removed during daily renewals. On Day 7 of the assay, surviving fish were tranquilized using Finquel® tricaine methane sulfonate and rinsed in deionized water, then placed on tared weighing pans and dried overnight at 104±5°C to obtain dry weight to 0.01 mg. To calculate the final dry biomass/fish, the net dry weight was divided by the number of organisms introduced at the start of the assay.

2.5 Data Analysis

Statistical analysis of acute and chronic exposure data was completed using CETIS™ v 1.8.6.6 and 1.9.0.9, Comprehensive Environmental Toxicity Information System, software. The program computes acute and chronic exposure endpoints based on US EPA decision tree guidelines specified in individual test methods. If survival in the highest test concentration is >50%, the LC-50 is obtained by direct observation of the raw data. As needed, the A-NOEC is determined as the highest test concentration that caused no significant mortality. For chronic exposure endpoints statistical significance was accepted at $\propto = 0.05$. For statistical calculations of *C. dubia* juvenile production, data from only the first three broods are used.

2.6 Quality Control

As part of the laboratory quality control program, reference toxicant evaluations are completed on a regular basis for each test species. These results, summarized in Table 2, provide regular laboratory performance evaluation through the comparison of historic data sets.

3.0 RESULTS AND DISCUSSION

Results of the chronic and modified acute exposure assays completed using *C. dubia* and *P. promelas* are presented in Tables 3 and 4, respectively. Water quality data collected during the assays are summarized in Table 5. US EPA Region I Attachment F toxicity test summary sheets are included after the tables. Support data, including copies of laboratory bench sheets, are provided in Appendix A.

3.1 Chronic Exposure Bioassay - *Ceriodaphnia dubia*

Minimum test acceptability criteria require 80% control survival, mean reproduction of 15 juveniles/female, production of 3 broods by at least 60% of control females, and the MSDp for reproduction to be <47% (US EPA 2002). Achievement of these results indicates that healthy test organisms were used and that the dilution water had no significant adverse impact on the outcome of the assay. See the Executive Summary and Table 3 for test acceptability.

3.2 Chronic Exposure Bioassay - *Pimephales promelas*

Minimum test acceptability criteria require 80% control survival, a mean dry weight of 0.25 mg/fish based on Day 7 survival, and the MSDp for biomass to be <30% (US EPA 2002). Achievement of these results indicates that healthy test organisms were used and that the dilution water had no significant adverse impact on the outcome of the assay. See the Executive Summary and Table 4 for test acceptability.

4.0 LITERATURE CITED

40 CFR §136.3. *Code of Federal Regulations* (CFR), Protection of the Environment (Title 40), Guidelines Establishing Test Procedures for the Analysis of Pollutants (Part 136), Identification of Test Procedures (sub-part 3), Table II-Required Containers, Preservation Techniques, and Holding Times.

APHA. 2012. *Standard Methods for the Examination of Water and Wastewater*, 22nd Edition. Washington D.C.

The NELAC Institute (TNI). 2009. *Environmental Laboratory Sector, Volume 1: Management and Technical Requirements for Laboratories Performing Environmental Analysis (TNI Standard)*. EL-V1-2009.

US EPA. 2000. *Method Guidance and Recommendations for Whole Effluent Toxicity (WET) Testing (40 CFR Part 136)*. EPA 821-B-00-004

US EPA. 2002. *Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms*. Fifth Edition. EPA-821-R-02-012.

US EPA. 2002. *Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*. Fourth Edition. EPA-821-R-02-013.

US EPA Region I. 2011. *US EPA Region 1 Freshwater Acute Toxicity Test Procedure and Protocol*. US EPA Region I Office, Boston, Massachusetts. February 28, 2011.

US EPA Region I. 2013. *Freshwater Chronic Toxicity Test Procedure and Protocol - US EPA Region I*. US EPA Region I Office, Boston, Massachusetts. March 2013.

TABLE 1. Summary of Sample Collection Information.
Kendall Green Energy Biomonitoring Evaluation. February 2016.

Sample Description	Type	Collection Date	Collection Time	Receipt Date	Receipt Time	Arrival Temp °C
EFFLUENT - Outfall 001						
Start	Comp	02/07-08/16	0800-0800	02/0816	1335	1
First Renewal	Comp	02/09-10/16	0815-0815	02/11/16	1200	2
Second Renewal	Comp	02/11-12/16	1030-1030	02/12/16	1240	1
RECEIVING WATER - Charles River						
Start	Grab	02/08/16	1045	02/08/16	1335	1
First Renewal	Grab	02/11/16	1000	02/11/16	1200	2
Second Renewal	Grab	02/12/16	1005	02/12/16	1240	1

TABLE 2. Summary of Reference Toxicant Data.
Kendall Green Energy Biomonitoring Evaluation. February 2016.

Date	Endpoint		Value	Historic Mean/ Central Tendency	Acceptable Range	Reference Toxicant
C. dubia						
02/18/16	Survival	LC-50	21.5	21.3	3.4 - 39.2	SDS (mg/L)
02/18/16	Survival	C-NOEC	15.0	30.0	15.0 - 60.0	Copper (µg/L)
02/18/16	Reproduction	C-NOEC	15.0	15.0	7.5 - 30.0	Copper (µg/L)
02/18/16	Reproduction	MSDp	32.7	31.9	13.1 - 50.7	Copper (µg/L)
P. promelas						
02/18/16	Survival	LC-50	35.5	31.7	22.4 - 41.0	SDS (mg/L)
01/26/16	Survival	C-NOEC	10.0	20.0	10.0 - 30.0	SDS (mg/L)
01/26/16	Growth	C-NOEC	5.0	10.0	5.0 - 20.0	SDS (mg/L)
01/26/16	Growth	MSDp	2.3	29.1	0 - 58.3	SDS (mg/L)

Means and Acceptable Ranges based on the most recent 20 reference toxicant assays

TABLE 3. Summary of Chronic and Modified Acute Results: *C. dubia*.
Kendall Green Energy Biomonitoring Evaluation. February 2016.

Effluent Conc.	Mean Percent Survival		Mean Reproduction	% Females Producing 3 Broods	Is There a Significant Difference Based on	
	Day 2	Day 7	(Juv/Female)		Survival (%)	Reproduction
LAB	100.0%	90.0%	23.3	90.0%	-	-
RW	90.0%	90.0%	19.1	70.0%	-	-
6.25%	100.0%	100.0%	20.5	80.0%	No	No
12.5% [b]	100.0%	100.0%	20.9	77.8%	No	No
25.0% [a]	100.0%	100.0%	24.4	100.0%	No	No
50.0%	100.0%	100.0%	24.3	90.0%	No	No
100.0%	80.0%	80.0%	9.8 [c]	30.0% [c]	No	No
	LC-50 = >100%		MSDp = 51.1% [c]		NOEC = 100%	NOEC = 50% [c] IC-25 = 68.5% [c]

COMMENTS:
RW = Receiving Water; used as the diluent.
[a] Replicate H of the 25% test concentration was removed from the statistical analysis for reproduction and calculation of brood production, but retained for the statistical analysis for survival because the daphnid was identified as male.
[b] Replicate I of the 12.5% test concentration was removed from statistical analyses because the daphnid was missing on test day 2.
[c] The daphnid assay failed to meet the protocol specified statistical variability limit (MSDp) for reproduction. The MSDp was computed to be 51.1%, which exceeds US EPA's acceptable range of 13% - 47% specified by the method protocol, suggesting that the assay is not sensitive enough to detect a significant difference at the permit limit via hypothesis testing. The data generally follow an inverse dose-response, with the greatest impact on reproduction observed in both the receiving water diluent control and in the 100% test concentration, which is not affected by the diluent and therefore indicative of an adverse response. These concentrations also displayed the highest variability among replicates. The calculated IC-25 for reproduction of 68.5% supports a C-NOEC of 50%. Further review revealed that replicate H produced no broods in either control or any test concentrations, and was identified as male in the 25% test concentration. Suspecting that all H replicates were male, an alternative statistical analysis of the reproduction data was completed that removed all H replicates. The alternative analysis resulted in a calculated C-NOEC of 50% and an MSDp of 25.1%, which falls within the US EPA's acceptable range. Based on these findings these data are considered provisionally valid and a C-NOEC of 50% is considered representative of the data.

TABLE 4. Summary of Chronic and Modified Acute Results: *P. promelas*. **Kendall Green Energy Biomonitoring Evaluation. February 2016.**

Effluent Conc.	Mean Percent Survival		Mean Biomass	Is There a Significant Difference Based on	
	Day 2	Day 7	(mg/fish)	Survival (%)	Growth (Biomass)
LAB [a]	100.0%	100.0%	0.490	-	-
RW	100.0%	100.0%	0.545	-	-
6.25%	100.0%	87.5%	0.490	No	No
12.5%	97.5%	92.5%	0.577	No	No
25.0%	100.0%	97.5%	0.653	No	No
50.0%	100.0%	100.0%	0.595	No	No
100.0%	100.0%	100.0%	0.605	No	No
	LC-50 = >100%		MSDp = 20.1%	NOEC = 100%	NOEC = 100%

COMMENTS:
RW = Receiving Water; used as the diluent.
[a] Replicate C of the laboratory non-diluent control had one fish unaccounted for on test day 7, therefore only 9 organisms were used from the start of the assay in this replicate for the statistical analyses.

TABLE 5. Initial Water Quality and Analytical Data Summary. Kendall Green Energy Biomonitoring Evaluation. February 2016.

PARAMETER	UNITS	EFFLUENT	RECEIVING WATER
Specific Conductance	µmhos/cm	1090	1484
pH	SU	7.36	7.36
Total Residual Chlorine	mg/L	<0.02	-

COMMENTS:
Additional water quality data are provided in Appendix A.

TOXICITY TEST SUMMARY SHEET

FACILITY NAME: Kendall Green Energy Facility
NPDES PERMIT NO.: MA0004898
TEST START DATE: 02/09/16
TEST END DATE: 02/16/16

TEST TYPE	TEST SPECIES	SAMPLE TYPE	SAMPLE METHOD
___ Acute	___ *Pimephales promelas*	___ Prechlorinated	___ Grab
___ Chronic	_X_ *Ceriodaphnia dubia*	___ Dechlorinated	_X_ Composite
_X_ Modified Chronic (Reporting Acute Values)	___ *Daphnia pulex*	___ Chlorine Spiked in Lab	___ Flow-thru
	___ *Americamysis bahia*	___ Chlorinated on Site	___ Other
	___ *Cyprinodon variegatus*	___ Unchlorinated	
___ 24 Hour Screen	___ *Menidia beryllina*	_X_ No Detectable Chlorine Upon Receipt	
	___ *Arbacia punctulata*		

DILUTION WATER:

_X_ Receiving water collected at a point upstream or away from the discharge, free from toxicity or other sources of contamination; Receiving Water Name: Charles River

___ Alternate surface water of known quality and hardness, to generally reflect the characteristics of the receiving water; Receiving Water Name: _____

___ Synthetic water prepared using either Millipore Milli-Q or equivalent deionized water and reagent grade chemicals; or deionized water combined with mineral water.

___ Artificial sea salts mixed with deionized water

___ Deionized water and hypersaline brine

___ Other

EFFLUENT SAMPLING DATES: 02/07-08/16 02/09-10/16 02/11-12/16 _____

EFFLUENT CONCENTRATIONS TESTED (%): 6.25%, 12.5%, 25%, 50%, 100%

Permit Limit Concentration: Report %

Was the effluent salinity adjusted? No If yes, to what level? _____ ppt

REFERENCE TOXICANT TEST DATE: 02/18/16 LC-50: 21.5 mg/L Sodium Dodecyl Sulfate
02/18/16 NOEC: 15.0 mg/ Copper

PERMIT LIMITS AND TEST RESULTS

Test Acceptability Criteria

Mean Diluent Control Survival: 90 %

Mean # Juveniles / Female: 19.1

MSDp: 51.1 %

LIMITS		**RESULTS**	
LC-50:	- %	LC-50:	>100 %
		Upper Limit:	- %
A-NOEC:	- %	Lower Limit:	- %
		Method:	Direct Observation
C-NOEC:	- %	A-NOEC:	- %
		C-NOEC:	50 %
		C-LOEC:	100 %
		IC- 25	68.5 %

TOXICITY TEST SUMMARY SHEET

FACILITY NAME: Kendall Green Energy Facility
NPDES PERMIT NO.: MA0004898
TEST START DATE: 02/09/16
TEST END DATE: 02/16/16

TEST TYPE	TEST SPECIES	SAMPLE TYPE	SAMPLE METHOD
___Acute	X *Pimephales promelas*	___Prechlorinated	___Grab
___Chronic	___*Ceriodaphnia dubia*	___Dechlorinated	X Composite
X Modified Chronic (Reporting Acute Values)	___*Daphnia pulex*	___Chlorine Spiked in Lab	___Flow-thru
	___*Americamysis bahia*	___Chlorinated on Site	___Other
___24 Hour Screen	___*Cyprinodon variegatus*	___Unchlorinated	
	___*Menidia beryllina*	X No Detectable Chlorine Upon Receipt	
	___*Arbacia punctulata*		

DILUTION WATER:

X Receiving water collected at a point upstream or away from the discharge, free from toxicity or other sources of contamination; Receiving Water Name: Charles River

___Alternate surface water of known quality and hardness, to generally reflect the characteristics of the receiving water; Receiving Water Name:

___Synthetic water prepared using either Millipore Milli-Q or equivalent deionized water and reagent grade chemicals; or deionized water combined with mineral water.

___Artificial sea salts mixed with deionized water

___Deionized water and hypersaline brine

___Other

EFFLUENT SAMPLING DATES: 02/07-08/16 02/09-10/16 02/11-12/16

EFFLUENT CONCENTRATIONS TESTED (%): 6.25%, 12.5%, 25%, 50%, 100%

Permit Limit Concentration: Report %

Was the effluent salinity adjusted? NO If yes, to what level? ____ppt

REFERENCE TOXICANT TEST DATE: 02/18/16 LC-50: 35.5 mg/L Sodium Dodecyl Sulfate
01/26/16 NOEC: 10.0 mg/L Sodium Dodecyl Sulfate

PERMIT LIMITS AND TEST RESULTS

Test Acceptability Criteria

Mean Diluent Control Survival: 100%

Mean Dry Weight/Fish: 0.545 mg/fish

MSDp: 20.1 %

LIMITS		**RESULTS**	
LC-50:	- %	LC-50:	>100 %
		Upper Limit:	- %
A-NOEC:	- %	Lower Limit:	- %
		Method:	Direct Observation
C-NOEC:	- %	A-NOEC:	- %
		C-NOEC:	100 %
		C-LOEC:	>100 %
		IC- ___	- %

APPENDIX A

DATA SHEETS

STATISTICAL SUPPORT

METHODS USED IN NPDES PERMIT BIOMONITORING TESTING

Parameter	Method
Acute Exposure Bioassays:	
Ceriodaphnia dubia	EPA-821-R-02-012 2002.0
Daphnia pulex	EPA-821-R-02-012 2021.0
Pimephales promelas	EPA-821-R-02-012 2000.0
Americamysis bahia	EPA-821-R-02-012 2007.0
Menidia beryllina	EPA-821-R-02-012 2006.0
Cyprinodon variegatus	EPA-821-R-02-012 2004.0
Chronic Exposure Bioassays:	
Ceriodaphnia dubia	EPA-821-R-02-013 1002.0
Pimephales promelas	EPA-821-R-02-013 1000.0
Cyprinodon variegatus	EPA-821-R-02-014 1004.0
Menidia beryllina	EPA-821-R-02-014 1006.0
Arbacia punctulata	EPA-821-R-02-014 1008.0
Champia parvula	EPA-821-R-02-014 1009.0
Trace Metals:	
Trace Metals	EPA 200.8/SW 6020, EPA 245.7
Hardness	Standard Methods 22nd Edition - Method 2340 B
Wet Chemistries:	
Alkalinity	EPA 310.2
Chlorine, Residual	Standard Methods 22nd Edition - Method 4500-Cl D
Total Organic Carbon	Standard Methods 22nd Edition - Method 5310 C
Specific Conductance	Standard Methods 22nd Edition - Method 2510 B
Nitrogen - Ammonia	Standard Methods 22nd Edition - Method 4500-NH_3 G
pH	Standard Methods 22nd Edition - Method 4500-H+ B
Solids, Total (TS)	Standard Methods 22nd Edition - Method 2540 B
Solids, Total Dissolved (TDS)	Standard Methods 22nd Edition - Method 2540 C
Solids, Total Suspended (TSS)	Standard Methods 22nd Edition - Method 2540 D
Dissolved Oxygen	Standard Methods 22nd Edition - Method 4500-O G

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The Commonwealth of Massachusetts

Department of Environmental Protection

Division of Environmental Analysis
Senator William X. Wall Experiment Station

certifies

M-NH906 **ENVIROSYSTEMS INC**
1 LAFAYETTE RD
HAMPTON, NH 03842-0000

Laboratory Director: **RUSSELL D. FOSTER**

for the analysis of **NON POTABLE WATER (CHEMISTRY)**

pursuant to 310 CMR 42.00

This certificate supersedes all previous Massachusetts certificates issued to this laboratory. The laboratory is regulated by and shall be responsible for being in compliance with Massachusetts regulations at 310 CMR 42.00.

This certificate is valid only when accompanied by the latest dated Certified Parameter List as issued by the Massachusetts D.E.P. Contact the Division of Environmental Analysis to verify the current certification status of the laboratory.

Certification is no guarantee of the validity of the data. This certification is subject to unannounced laboratory inspections.

Issued: **01 JUL 2015**

Expires: **30 JUN 2016**

Oscar C. Jacobs

Director, Division of Environmental Analysis

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Certified Parameter List as of: 01 JUL 2015

M-NH906 ENVIROSYSTEMS INC
HAMPTON NH

NON POTABLE WATER (CHEMISTRY) **Effective Date 01 JUL 2015** **Expiration Date 30 JUN 2016**

Analytes	Methods
ALUMINUM	EPA 200.8
ANTIMONY	EPA 200.8
ARSENIC	EPA 200.8
BERYLLIUM	EPA 200.8
CADMIUM	EPA 200.8
CHROMIUM	EPA 200.8
COBALT	EPA 200.8
COPPER	EPA 200.8
IRON	EPA 200.8
LEAD	EPA 200.8
MANGANESE	EPA 200.8
MERCURY	EPA 245.7
MOLYBDENUM	EPA 200.8
NICKEL	EPA 200.8
SELENIUM	EPA 200.8
SILVER	EPA 200.8
THALLIUM	EPA 200.8
VANADIUM	EPA 200.8
ZINC	EPA 200.8
PH	SM 4500-H-B
SPECIFIC CONDUCTIVITY	SM 2510B
TOTAL DISSOLVED SOLIDS	SM 2540C
ALKALINITY, TOTAL	EPA 310.2
CHLORIDE	SM 4500-CL-C
CHLORIDE	EPA 300.0
SULFATE	EPA 300.0
AMMONIA-N	SM 4500-NH3-B, G
NITRATE-N	SM 4500-NO3-F
KJELDAHL-N	SM 4500-NH3-B, G
ORTHOPHOSPHATE	SM 4500-P-E
PHOSPHORUS, TOTAL	SM 4500-P-B,E
BIOCHEMICAL OXYGEN DEMAND	SM 5210B
TOTAL ORGANIC CARBON	SM 5310C
CYANIDE, TOTAL	SM 4500-CN-C,E
NON-FILTERABLE RESIDUE	SM 2540D
OIL AND GREASE	EPA 1664
VOLATILE HALOCARBONS	EPA 624
VOLATILE AROMATICS	EPA 624
CHLORDANE	EPA 608
ALDRIN	EPA 608
DIELDRIN	EPA 608
DDD	EPA 608
DDE	EPA 608

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Certified Parameter List as of: 01 JUL 2015

M-NH906 **ENVIROSYSTEMS INC**
HAMPTON NH

NON POTABLE WATER (CHEMISTRY) **Effective Date** **01 JUL 2015** **Expiration Date** **30 JUN 2016**

Analytes	Methods
DDT	EPA 608
HEPTACHLOR	EPA 608
HEPTACHLOR EPOXIDE	EPA 608
SVOC-ACID EXTRACTABLES	EPA 625
SVOC-BASE/NEUTRAL EXTRACTABLES	EPA 625
POLYCHLORINATED BIPHENYLS (WATEF	EPA 608

Ceriodaphnia dubia Chronic Reproduction Assay

STUDY#: 27001
CLIENT: ESS Laboratories- Kendall Station
SAMPLE: Effluent
DILUENT: RW
Cerio Data source: MSR ☐ MHR ☒
collected: previous pm ☐ test day am ☒
Day 0 02/09/16 Time: 1610 Initial: BP
Day 1 02/10/16 Time: 1410 Initial: EB
Day 2 02/11/16 Time: 1345 Initial: HK
Day 3 02/12/16 Time: 1330 Initial: [illegible]
Day 4 02/13/16 Time: 1250 Initial: BG
Day 5 02/14/16 Time: 1340 Initial: BP
Day 6 02/15 Time: 1230 Initial: EH
Day 7 02/16/16 Time: 1440 Initial: NP
Day 8 Time: Initial:

LEGEND:
+ = Live
- = Dead
♂ = Male
M = Missing

Calculations: Initials: EH Date: 02/16/16

CONC	Day	A	B	C	D	E	F	G	H	I	J	SUM	SURV
MSR	0	+	+	+	+	+	+	+	+	+	+	0	10
	1	+	+	+	+	+	+	+	+	+	+	0	10
	2	+	+	+	+	+	+	+	+	+	+	0	10
	3	+	+	+	+	+	+	+	+	+	+	0	10
	4	6	5	5	4	7	5	5	+	6	5	48	10
	5	10	9	9	11	10	9	8	+	10	12	88	10
	6	+	6	12	6-	8	+	+	+	7	+	39	9
	7	17'	♂	♂	↓	+'	12'	15	+	+	14'	58	9
	8				↓								
	Total	33	20	26	21	25	26	28	0	23	31	233	9
RW	0	+	+	+	+	+	+	+	+	+	+	0	10
	1	+	+	+	+	+	+	+	+	+	+	0	10
	2	+	+	+	+	↓	+	+	+	+	+	0	9
	3	+	+	+	+		+	+	+	+	+	0	9
	4	4	3	4	4		5	5	+	6	5	36	9
	5	11	10	9	9		3	8	+	12	10	72	9
	6	+	+	7	+		+	9	+	(4)	(3)	23	9
	7	♂	8'	+	14'		13	15'	+	(12')	(13')	~~35~~ 60	9
	8					↓				LB 3/14/16	LB 3/14/16	LB 3/14/16	
	Total	15	21	20	27	0	21	22	0	~~23~~ 24	~~18~~ 21	~~166~~ 191	9
6.25%	0	+	+	+	+	+	+	+	+	+	+	0	10
	1	+	+	+	+	+	+	+	+	+	+	0	10
	2	+	+	+	+	+	+	+	+	+	+	0	10
	3	+	+	+	+	+	+	+	+	+	+	0	10
	4	5	6	6	5	6	6	6	+	5	7	52	10
	5	10	8	7	9	8	7	+	+	9	(7)	65	10
	6	6	+	+	+	5	+	10	+	+	(4)	25	10
	7	+	8	+	~~14~~ 10 NP 2/16	+	15	16	+	9	(1)	~~52~~ 63 LB 3/14/16	10
	8										LB 3/14/16	LB 3/14/16	
	Total	21	22	13	24	19	28	26	0	23	~~18~~ 29	~~194~~ 205	10
12.5%	0	+	+	+	+	+	+	+	+	+	+	0	10
	1	+	+	+	+	+	+	+	+	+	+	0	10
	2	+	+	+	+	+	+	+	+	M (10) HK 2/11	+	0	9
	3	+	+	+	+	+	+	+	+	↓	+	0	9
	4	5	7	6	7	6	5	6	+		4	46	9
	5	9	7	7	11	10	10	+	+		+	54	9
	6	+	+	7	+	+	+	5	+		4	16	9
	7	13	10	+	16	+	13	12	+		14	72	9
	8									↓			
	Total	27	24	20	28	16	28	23	0	0	22	188	9

Margin notes: MSR 90%; RW 70%; 6.25% 80%; 12.5% 77.8%

(10) HK 2/11 no organism in cup

Ceriodaphnia dubia Chronic Reproduction Assay

STUDY# 27001

CLIENT: ESS Laboratories- Kendall Station

SAMPLE: Effluent

DILUENT: RW

Cerio Data source: MSR ☐ MHR ☒

collected: previous pm ☐ test day am ☒

Day 0 02/09/16 Time: 1605 Initial: BP

Day 1 02/10/16 Time: 1410 Initial: ES

Day 2 02/11/16 Time: 1350 Initial: HK

Day 3 02/12/16 Time: 1330 Initial: [illegible]

Day 4 02/13/16 Time: 1250 Initial: DC

Day 5 2/14/16 Time: 1340 Initial: BP

Day 6 02/15 Time: 1230 Initial: EH

Day 7 02/16/16 Time: 1440 Initial: NP

Day 8 Time: Initial:

LEGEND:
+ = Live
- = Dead
♂ = Male
M = Missing

Calculations:

Initials: EH

Date: 02/16/16

CONC	Day	A	B	C	D	E	F	G	H	I	J	SUM	SURV	
25%	0	+	+	+	+	+	+	+	+	+	+	0	10	
	1	+	+	+	+	+	+	+	+	+	+	0	10	
	2	+	+	+	+	+	+	+	+	+	+	0	10	
	3	+	+	+	+	+	+	+	+	+	+	0	10	
	4	4	6	5	6	5	6	5	+	5	6	48	10	
	5	11	6	12	7	9	10	+	7	8	8	71	10	100%
	6	+	+	+	+	6	+	11	+	+	+	17	10	
	7	9	+	4	13	+	16	17	+♂	14	11	84	10	
	8													
	Total	24	12	21	26	20	32	33	0	27	25	220	10	
50%	0	+	+	+	+	+	+	+	+	+	+	0	10	
	1	+	+	+	+	+	+	+	+	+	+	0	10	
	2	+	+	+	+	+	+	+	+	+	+	0	10	
	3	+	+	+	+	+	+	+	+	+	+	0	10	
	4	5	4	6	6	6	5	6	+	5	5	48	10	
	5	13	5	10	9	6	8	+	7	7	12	70	10	90%
	6	+	+	+	+	4	+	13	+	10	8	35	10	
	7	15	16	12	14	+	16	14	+	3	+	90 ~~108~~	10	
	8													
	Total	33	25	28	29	16	29	33	0	225	25	243	10	
100%	0	+	+	+	+	+	+	+	+	+	+	0	10	
	1	+	+	+	+	+	+	+	+	+	+	0	10	
	2	+	+	+	+	+	+	—	—	+	+	0	8	
	3	+	+	+	+	+	+			+	+	0	8	
	4	3	+	+	+	4	+			+	4	11	8	
	5	9	+	+	3	3	+			3	6	24	8	30%
	6	+	+	+	+	3	+			+	7	10	8	
	7	15	13	4	9	2	10			+	+	53	8	
	8													
	Total	27	13	4	12	12	10	0	0	3	17	98	8	
	0													
	1													
	2													
	3													
	4													
	5													
	6													
	7													
	8													
	Total													

Ceriodaphnia 7-d Survival and Reproduction Test — **EnviroSystems, Inc.**

Batch ID:	16-5533-0558	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Lisa Bordonaro
Start Date:	09 Feb-16 16:10	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Receiving Water
Ending Date:	16 Feb-16 14:40	**Species:**	Ceriodaphnia dubia	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	In-House Culture	**Age:**	<1d

Sample ID:	08-0736-5372	**Code:**	27001	**Client:**	ESS Laboratory
Sample Date:	08 Feb-16 08:00	**Material:**	Industrial Effluent	**Project:**	First Quarter WET Compliance Test
Receipt Date:	08 Feb-16 13:35	**Source:**	Kendall Green Energy Facility		
Sample Age:	32h (1 °C)	**Station:**	Kendall Green Energy (MA0004898)		

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD
19-6563-3240	7d Proportion Survived	Fisher Exact/Bonferroni-Holm Test	100	> 100	n/a	1	n/a
06-7345-9712	Reproduction	Wilcoxon/Bonferroni Adj Test	100	> 100	n/a	1	51.1%

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU
17-4136-9442	Reproduction	Linear Interpolation (ICPIN)	IC10	56.7	24.4	60.6	1.763
			IC25	68.5	58	81.2	1.459

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
19-6563-3240	7d Proportion Survived	Control Resp	0.9	0.8	>>	Yes	Passes Acceptibility Criteria
06-7345-9712	Reproduction	Control Resp	19.1	15	>>	Yes	Passes Acceptibility Criteria
17-4136-9442	Reproduction	Control Resp	19.1	15	>>	Yes	Passes Acceptibility Criteria

7d Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	MS	10	0.900	0.674	1.000	0.000	1.000	0.100	0.316	35.14%	0.00%
0	RW	10	0.900	0.674	1.000	0.000	1.000	0.100	0.316	35.14%	0.00%
6.25		10	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	-11.11%
12.5		9	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	-11.11%
25		10	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	-11.11%
50		10	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	-11.11%
100		10	0.800	0.498	1.000	0.000	1.000	0.133	0.422	52.70%	11.11%

Reproduction Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	MS	10	23.3	16.8	29.8	0	33	2.89	9.14	39.23%	0.00%
0	RW	10	19.1	10.9	27.3	0	34	3.63	11.5	60.18%	18.03%
6.25		10	20.5	14.4	26.6	0	29	2.7	8.55	41.73%	12.02%
12.5		9	20.9	14.1	27.6	0	28	2.92	8.77	41.97%	10.35%
25		9	24.4	19.5	29.4	12	33	2.13	6.39	26.12%	-4.91%
50		10	24.3	17.3	31.3	0	33	3.11	9.83	40.46%	-4.29%
100		10	9.8	3.77	15.8	0	27	2.67	8.43	86.02%	57.94%

Ceriodaphnia 7-d Survival and Reproduction Test EnviroSystems, Inc.

7d Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	MS	1.000	1.000	1.000	0.000	1.000	1.000	1.000	1.000	1.000	1.000
0	RW	1.000	1.000	1.000	1.000	0.000	1.000	1.000	1.000	1.000	1.000
6.25		1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
12.5		1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		1.000
25		1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
50		1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
100		1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.000	1.000	1.000

Reproduction Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	MS	33	20	26	21	25	26	28	0	23	31
0	RW	15	21	20	27	0	21	22	0	34	31
6.25		21	22	13	24	19	28	26	0	23	29
12.5		27	24	20	28	16	28	23	0		22
25		24	12	21	26	20	32	33		27	25
50		33	25	28	29	16	29	33	0	25	25
100		27	13	4	12	12	10	0	0	3	17

Ceriodaphnia 7-d Survival and Reproduction Test — **EnviroSystems, Inc.**

Analysis ID:	19-6563-3240	**Endpoint:**	7d Proportion Survived	**CETIS Version:**	CETISv1.9.0
Analyzed:	15 Mar-16 14:28	**Analysis:**	STP 2xK Contingency Tables	**Official Results:**	Yes

Sample ID:	08-0736-5372	**Code:**	27001	**Client:**	ESS Laboratory
Sample Date:	08 Feb-16 08:00	**Material:**	Industrial Effluent	**Project:**	First Quarter WET Compliance Test
Receipt Date:	08 Feb-16 13:35	**Source:**	Kendall Green Energy Facility		
Sample Age:	32h (1 °C)	**Station:**	Kendall Green Energy (MA0004898)		

Data Transform	Alt Hyp	Trials	Seed	TST b	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	C > T	n/a	n/a	n/a	100	> 100	n/a	1	n/a

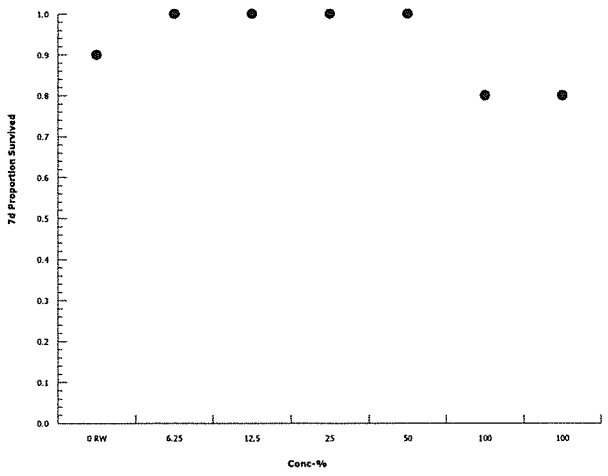
Fisher Exact/Bonferroni-Holm Test

Control	vs	Group	Test Stat	P-Type	P-Value	Decision(α:5%)
Receiving Water		6.25	1.000	Exact	1.0000	Non-Significant Effect
		12.5	1.000	Exact	1.0000	Non-Significant Effect
		25	1.000	Exact	1.0000	Non-Significant Effect
		50	1.000	Exact	1.0000	Non-Significant Effect
		100	0.500	Exact	1.0000	Non-Significant Effect

Data Summary

Conc-%	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
0	RW	9	1	10	0.9	0.1	0.0%
6.25		10	0	10	1	0	-11.1%
12.5		9	0	9	1	0	-11.1%
25		10	0	10	1	0	-11.1%
50		10	0	10	1	0	-11.1%
100		8	2	10	0.8	0.2	11.1%

Graphics



CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **EnviroSystems, Inc.**

Analysis ID:	06-7345-9712	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.0
Analyzed:	15 Mar-16 14:28	**Analysis:**	Nonparametric-Multiple Comparison	**Official Results:**	Yes
Sample ID:	08-0736-5372	**Code:**	27001	**Client:**	ESS Laboratory
Sample Date:	08 Feb-16 08:00	**Material:**	Industrial Effluent	**Project:**	First Quarter WET Compliance Test
Receipt Date:	08 Feb-16 13:35	**Source:**	Kendall Green Energy Facility		
Sample Age:	32h (1 °C)	**Station:**	Kendall Green Energy (MA0004898)		

Data Transform	Alt Hyp	Trials	Seed	TST b	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	C > T	n/a	n/a	n/a	100	> 100	n/a	1	51.1%

Wilcoxon/Bonferroni Adj Test

Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Receiving Water		6.25	110	NA	3	18	Exact	1.0000	Non-Significant Effect
		12.5	96.5	NA	4	17	Exact	1.0000	Non-Significant Effect
		25	102	NA	3	17	Exact	1.0000	Non-Significant Effect
		50	122	NA	1	18	Exact	1.0000	Non-Significant Effect
		100	79.5	NA	2	18	Exact	0.1346	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1416.91	283.382	5	3.43	0.0094	Significant Effect
Error	4298.21	82.6579	52			
Total	5715.12		57			

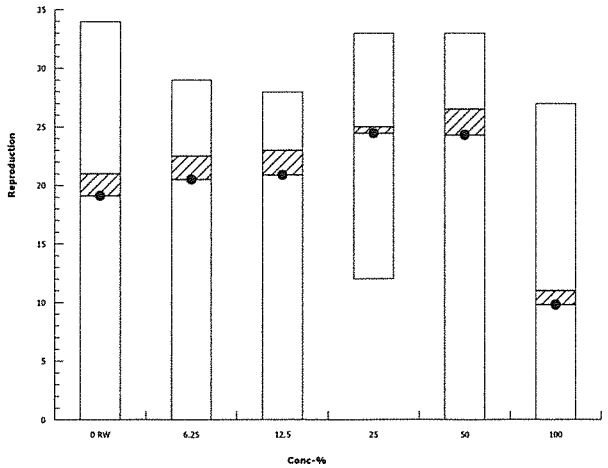
Distributional Tests

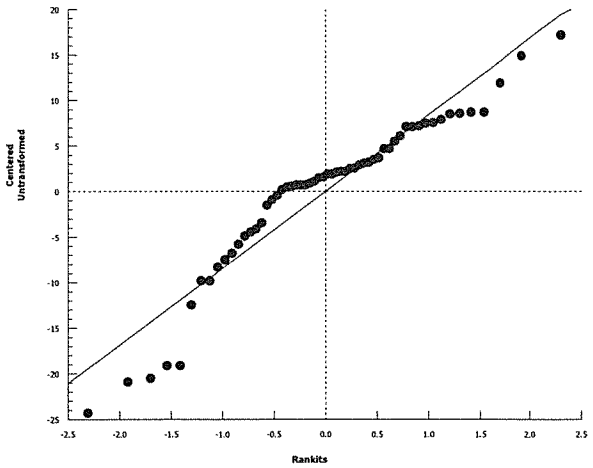
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	2.93	15.1	0.7107	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.916	0.944	6.7E-04	Non-Normal Distribution

Reproduction Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	RW	10	19.1	10.9	27.3	21	0	34	3.63	60.18%	0.00%
6.25		10	20.5	14.4	26.6	22.5	0	29	2.7	41.73%	-7.33%
12.5		9	20.9	14.1	27.6	23	0	28	2.92	41.97%	-9.37%
25		9	24.4	19.5	29.4	25	12	33	2.13	26.12%	-27.98%
50		10	24.3	17.3	31.3	26.5	0	33	3.11	40.46%	-27.23%
100		10	9.8	3.77	15.8	11	0	27	2.67	86.02%	48.69%

Graphics





CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **EnviroSystems, Inc.**

Analysis ID:	17-4136-9442	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.0
Analyzed:	15 Mar-16 14:29	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Sample ID:	08-0736-5372	**Code:**	27001	**Client:**	ESS Laboratory
Sample Date:	08 Feb-16 08:00	**Material:**	Industrial Effluent	**Project:**	First Quarter WET Compliance Test
Receipt Date:	08 Feb-16 13:35	**Source:**	Kendall Green Energy Facility		
Sample Age:	32h (1 °C)	**Station:**	Kendall Green Energy (MA0004898)		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	2076930	200	Yes	Two-Point Interpolation

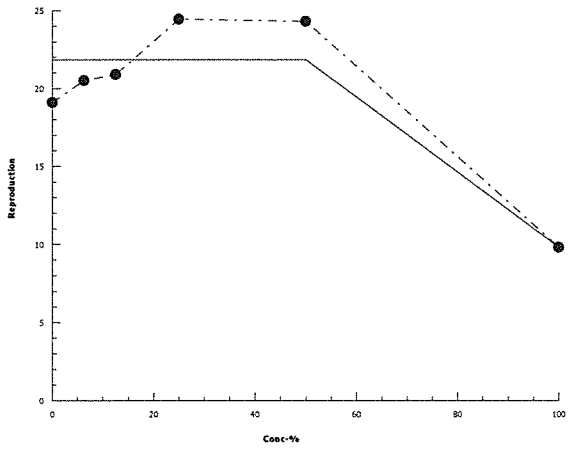
Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC10	56.7	24.4	60.6	1.763	1.651	4.095
IC25	68.5	58	81.2	1.459	1.232	1.724

Reproduction Summary

			Calculated Variate						
Conc-%	Code	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	RW	10	19.1	0	34	3.63	11.5	60.18%	0.00%
6.25		10	20.5	0	29	2.7	8.55	41.73%	-7.33%
12.5		9	20.9	0	28	2.92	8.77	41.97%	-9.37%
25		9	24.4	12	33	2.13	6.39	26.12%	-27.98%
50		10	24.3	0	33	3.11	9.83	40.46%	-27.23%
100		10	9.8	0	27	2.67	8.43	86.02%	48.69%

Graphics



Ceriodaphnia 7-d Survival and Reproduction Test — **EnviroSystems, Inc.**

Batch ID:	01-1530-8120	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Lisa Bordonaro
Start Date:	09 Feb-16 16:10	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Mod-Soft Synthetic Water
Ending Date:	16 Feb-16 14:40	**Species:**	Ceriodaphnia dubia	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	In-House Culture	**Age:**	<24h

Sample ID:	11-7489-7083	**Code:**	27001	**Client:**	ESS Laboratory
Sample Date:	08 Feb-16 08:00	**Material:**	Industrial Effluent	**Project:**	First Quarter WET Compliance Test
Receive Date:	08 Feb-16 13:35	**Source:**	Kendall Green Energy Facility		
Sample Age:	32h (1 °C)	**Station:**	Kendall Green Energy (MA0004898)		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
01-9334-8855	7d Proportion Survived	100	>100	NA	NA	1	Fisher Exact/Bonferroni-Holm Test
13-5705-9850	Reproduction	50	100	70.71	25.1%	2	Bonferroni Adj t Test

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
01-9334-8855	7d Proportion Survived	Control Resp	0.9	0.8 - NL	Yes	Passes Acceptability Criteria
13-5705-9850	Reproduction	Control Resp	25.9	15 - NL	Yes	Passes Acceptability Criteria
13-5705-9850	Reproduction	PMSD	0.251	0.13 - 0.47	Yes	Passes Acceptability Criteria

7d Proportion Survived Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Moderately Soft	10	0.9	0.674	1	0	1	0.1	0.316	35.1%	0.0%
0	Receiving Water	10	0.9	0.674	1	0	1	0.1	0.316	35.1%	0.0%
6.25		10	1	1	1	1	1	0	0	0.0%	-11.1%
12.5		9	1	1	1	1	1	0	0	0.0%	-11.1%
25		10	1	1	1	1	1	0	0	0.0%	-11.1%
50		10	1	1	1	1	1	0	0	0.0%	-11.1%
100		10	0.8	0.498	1	0	1	0.133	0.422	52.7%	11.1%

Reproduction Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Moderately Soft	9	25.9	22.6	29.2	20	33	1.44	4.31	16.7%	0.0%
0	Receiving Water	9	21.2	13.6	28.8	0	34	3.3	9.9	46.6%	18.0%
6.25		9	22.8	19	26.5	13	29	1.63	4.89	21.5%	12.0%
12.5		8	23.5	20	27	16	28	1.49	4.21	17.9%	9.23%
25		9	24.4	19.5	29.4	12	33	2.13	6.39	26.1%	5.58%
50		9	27	23	31	16	33	1.72	5.17	19.2%	-4.29%
100		9	10.9	4.62	17.2	0	27	2.72	8.16	75.0%	57.9%

Ceriodaphnia 7-d Survival and Reproduction Test — **EnviroSystems, Inc.**

7d Proportion Survived Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Moderately Soft	1	1	1	0	1	1	1	1	1	1
0	Receiving Water	1	1	1	1	0	1	1	1	1	1
6.25		1	1	1	1	1	1	1	1	1	1
12.5		1	1	1	1	1	1	1	1		1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	0	0	1	1

Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Moderately Soft	33	20	26	21	25	26	28	23	31	
0	Receiving Water	15	21	20	27	0	21	22	34	31	
6.25		21	22	13	24	19	28	26	23	29	
12.5		27	24	20	28	16	28	23		22	
25		24	12	21	26	20	32	33	27	25	
50		33	25	28	29	16	29	33	25	25	
100		27	13	4	12	12	10	0	3	17	

Ceriodaphnia 7-d Survival and Reproduction Test — **EnviroSystems, Inc.**

Analysis ID:	01-9334-8855	**Endpoint:**	7d Proportion Survived	**CETIS Version:**	CETISv1.9.0
Analyzed:	15 Mar-16 14:37	**Analysis:**	STP 2xK Contingency Tables	**Official Results:**	Yes
Sample ID:	11-7489-7083	**Code:**	27001	**Client:**	ESS Laboratory
Sample Date:	08 Feb-16 08:00	**Material:**	Industrial Effluent	**Project:**	First Quarter WET Compliance Test
Receipt Date:	08 Feb-16 13:35	**Source:**	Kendall Green Energy Facility		
Sample Age:	32h (1 °C)	**Station:**	Kendall Green Energy (MA0004898)		

Data Transform	Alt Hyp	Trials	Seed	TST b	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	C > T	n/a	n/a	n/a	100	> 100	n/a	1	n/a

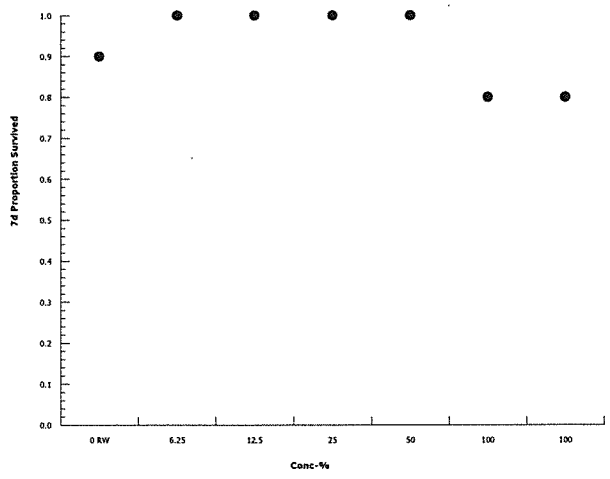
Fisher Exact/Bonferroni-Holm Test

Control	vs	Group	Test Stat	P-Type	P-Value	Decision(α:5%)
Receiving Water		6.25	1.000	Exact	1.0000	Non-Significant Effect
		12.5	1.000	Exact	1.0000	Non-Significant Effect
		25	1.000	Exact	1.0000	Non-Significant Effect
		50	1.000	Exact	1.0000	Non-Significant Effect
		100	0.500	Exact	1.0000	Non-Significant Effect

Data Summary

Conc-%	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
0	RW	9	1	10	0.9	0.1	0.0%
6.25		10	0	10	1	0	-11.1%
12.5		9	0	9	1	0	-11.1%
25		10	0	10	1	0	-11.1%
50		10	0	10	1	0	-11.1%
100		8	2	10	0.8	0.2	11.1%

Graphics



CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **EnviroSystems, Inc.**

Analysis ID:	13-5705-9850	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.6
Analyzed:	16 Mar-16 11:59	**Analysis:**	Parametric-Multiple Comparison	**Official Results:**	Yes

Sample ID:	11-7489-7083	**Code:**	27001	**Client:**	ESS Laboratory
Sample Date:	08 Feb-16 08:00	**Material:**	Industrial Effluent	**Project:**	First Quarter WET Compliance Test
Receive Date:	08 Feb-16 13:35	**Source:**	Kendall Green Energy Facility		
Sample Age:	32h (1 °C)	**Station:**	Kendall Green Energy (MA0004898)		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C > T	NA	NA	25.1%	50	100	70.71	2

Bonferroni Adj t Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Moderately Soft Lab		6.25	1.15	2.41	6.49	16	0.6360	CDF	Non-Significant Effect
		12.5	0.86	2.41	6.69	15	0.9860	CDF	Non-Significant Effect
		25	0.536	2.41	6.49	16	1.0000	CDF	Non-Significant Effect
		50	-0.412	2.41	6.49	16	1.0000	CDF	Non-Significant Effect
		100*	5.56	2.41	6.49	16	<0.0001	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1541.124	308.2247	5	9.42	<0.0001	Significant Effect
Error	1537.556	32.71395	47			
Total	3078.679		52			

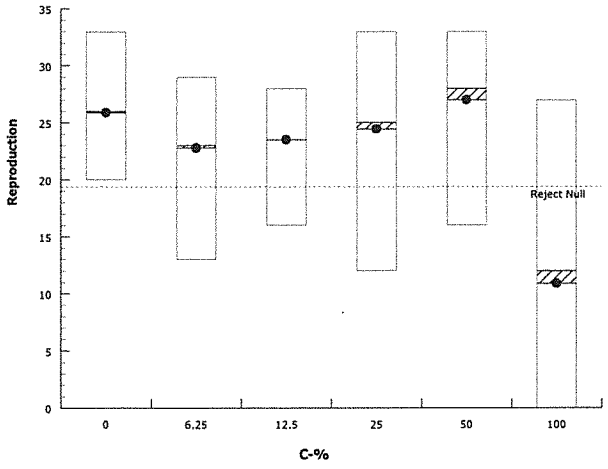
Distributional Tests

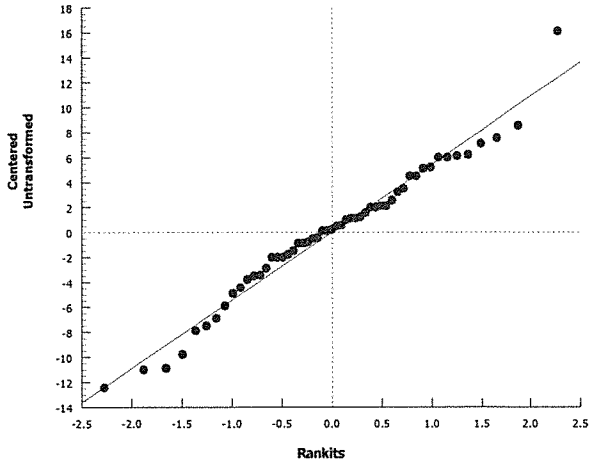
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	5.2	15.1	0.3916	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.978	0.94	0.4153	Normal Distribution

Reproduction Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Moderately Soft	9	25.9	22.6	29.2	26	20	33	1.44	16.7%	0.0%
6.25		9	22.8	19	26.5	23	13	29	1.63	21.5%	12.0%
12.5		8	23.5	20	27	23.5	16	28	1.49	17.9%	9.23%
25		9	24.4	19.5	29.4	25	12	33	2.13	26.1%	5.58%
50		9	27	23	31	28	16	33	1.72	19.2%	-4.29%
100		9	10.9	4.62	17.2	12	0	27	2.72	75.0%	57.9%

Graphics





Pimephales promelas 7 DAY CHRONIC ASSAY

STUDY: 27001	CLIENT: ESS Laboratories	SAMPLE: Effluent - Kendall Station	DILUENT: Receiving Water	FISH/BATCH:

		NUMBER OF SURVIVORS								OLD DISSOLVED OXYGEN (mg/L)						
CON	REP	0	1	2	3	4	5	6	7	1	2	3	4	5	6	7
MSR	A	10	10	10	10	10	10	10	10	7.7	7.5	6.7	6.7	6.2	6.8	7.5
	B	10	10	10	10	10	10	10	10	7.4	7.4	6.6	6.7	6.1	6.5	7.2
	C	10	10	10	10	10	10	10	9	7.4	7.4	5.5	6.8	6.2	6.4	7.1
	D	10	10	10	10	10	10	10	10	7.3	7.2	5.9	6.5	6.2	6.6	7.0
RW	A	10	10	10	10	10	10	10	10	7.3	7.2	5.9	6.3	7.0	6.7	7.0
	B	10	10	10	10	10	10	10	10	7.4	7.2	5.8	6.2	7.0	6.8	7.0
	C	10	10	10	10	10	10	10	10	7.5	7.0	6.1	6.2	6.9	7.0	7.0
	D	10	10	10	10	10	10	10	10	7.6	6.8	6.1	6.2	7.0	7.0	7.0
6.25%	A	10	10	10	10	10	10	10	10	7.7	6.8	6.2	6.2	7.1	7.1	7.0
	B	10	10	10	10	9	7	7	7	7.5	6.8	6.2	6.1	7.0	7.1	7.0
	C	10	10	10	10	10	10	9	9	7.4	6.7	6.0	6.0	6.9	7.1	7.0
	D	10	10	10	10	10	9	9	9	7.5	6.7	5.7	5.9	6.8	7.0	7.1
12.5%	A	10	9	9	9	9	9	9	9	7.5	6.6	6.0	6.2	7.1	7.1	7.1
	B	10	10	10	10	10	10	10	10	7.4	6.6	6.0	6.3	7.1	7.1	7.1
	C	10	10	10	10	10	10	10	10	7.5	6.6	6.1	6.2	7.1	7.1	7.0
	D	10	10	10	10	9	8	8	8	7.6	6.7	6.2	6.2	7.1	7.1	7.1
25%	A	10	10	10	10	10	10	10	10	7.5	6.7	6.1	6.5	6.8	7.1	7.0
	B	10	10	10	10	10	10	10	10	7.3	6.8	6.1	6.5	6.7	7.0	7.1
	C	10	10	10	10	10	10	10	10	7.3	6.9	6.2	6.4	6.7	6.9	7.1
	D	10	10	10	10	10	9	9	9	7.3	7.0	6.2	6.5	6.7	6.9	7.0
50%	A	10	10	10	10	10	10	10	10	7.5	7.0	6.2	6.4	6.7	6.7	7.0
	B	10	10	10	10	10	10	10	10	7.4	7.1	5.8	6.4	6.8	6.6	7.0
	C	10	10	10	10	10	10	10	10	7.4	7.1	5.8	6.5	6.7	6.6	6.9
	D	10	10	10	10	10	10	10	10	7.0	7.1	6.0	6.6	6.7	6.7	6.8
100%	A	10	10	10	10	10	10	10	10	7.2	7.1	6.3	6.5	6.8	6.9	6.8
	B	10	10	10	10	10	10	10	10	7.4	7.2	6.3	6.6	6.8	6.9	6.7
	C	10	10	10	10	10	10	10	10	7.4	7.2	6.5	6.8	6.9	6.8	6.7
	D	10	10	10	10	10	10	10	10	7.4	7.1	6.6	6.4	6.9	6.8	6.5
INC TEMP:		26	25	25	25	25	25	26	26							
DATE:		2/9/16	2/10/16	02/11/16	02/12/16	02/13/16	02/14	02/15	02/16							
TIME:		~~1325~~ 1320	1225	1250	1220	1030	1215	1115	1200							
INITIALS:		CB	ku	HK	HK	HK	EH	EH	HK							

(E3) CB 2/9/16

(E10) HK 2/16

no dead organism in cup

	STUDY:	**27001**				
	CLIENT:	**Kendall Station**				
	PROJECT:					
	ASSAY:	**PP7DCR**				
	TASK:	**Dry Weight Data - Balance Output File**				
	BALANCE:	**Mettler AE 100**				
	Serial #:	**J93681**				
	Date / Init:	03/02/16 HK	03/04/16 BG		Duplicates	
Sample	Rep	Total Wt (mg)	Tare Wt (mg)		Total Wt (mg)	Tare Wt (mg)
Lab	A	19.5	14.1		19.5	14.1
Lab	B	12.8	8.1			
Lab	C	15.1	10.6			
Lab	D	21.8	17.3			
RW	A	15.9	10.6			
RW	B	13.5	7.7			
RW	C	15.7	10.4			
RW	D	12.7	7.3			
6.25%	A	15.7	10.7			
6.25%	B	17.6	13.2			
6.25%	C	16.8	11.6			
6.25%	D	15.1	10.1			
12.5%	A	18.5	12.2		18.5	12.2
12.5%	B	19.2	13.7			
12.5%	C	19.5	13			
12.5%	D	16.3	11.5			
25%	A	18.9	12.1			
25%	B	16	9.2			
25%	C	21.7	15.2			
25%	D	17.6	11.6			
50%	A	14.5	9.4			
50%	B	17.1	11.8			
50%	C	20.2	14.1			
50%	D	19.3	12			
100%	A	16.9	11.8		16.9	11.9
100%	B	15.9	9.9			
100%	C	20.3	14.1			
100%	D	19.1	12.2			

Fathead Minnow 7-d Larval Survival and Growth Test — **EnviroSystems, Inc.**

Batch ID:	03-4177-7059	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Lisa Bordonaro
Start Date:	09 Feb-16 15:20	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Receiving Water
Ending Date:	16 Feb-16 12:00	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	6d 21h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	<48h

Sample ID:	08-0736-5372	**Code:**	27001	**Client:**	ESS Laboratory
Sample Date:	08 Feb-16 08:00	**Material:**	Industrial Effluent	**Project:**	First Quarter WET Compliance Test
Receive Date:	08 Feb-16 13:35	**Source:**	Kendall Green Energy Facility		
Sample Age:	31h (1 °C)	**Station:**	Kendall Green Energy (MA0004898)		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
00-0133-4001	7d Proportion Survived	100	>100	NA	10.3%	1	Steel Many-One Rank Sum Test
14-8440-6994	Mean Dry Biomass-mg	100	>100	NA	20.1%	1	Dunnett Multiple Comparison Test
08-8568-2359	Mean Dry Weight-mg	100	>100	NA	19.4%	1	Dunnett Multiple Comparison Test

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
00-0133-4001	7d Proportion Survived	Control Resp	1	0.799999 - NL	Yes	Passes Acceptability Criteria
14-8440-6994	Mean Dry Biomass-mg	Control Resp	0.545	0.25 - NL	Yes	Passes Acceptability Criteria
08-8568-2359	Mean Dry Weight-mg	Control Resp	0.545	0.25 - NL	Yes	Passes Acceptability Criteria
14-8440-6994	Mean Dry Biomass-mg	PMSD	0.201	0.12 - 0.3	Yes	Passes Acceptability Criteria
08-8568-2359	Mean Dry Weight-mg	PMSD	0.194	0.12 - 0.3	Yes	Passes Acceptability Criteria

7d Proportion Survived Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Moderately Soft	4	1	1	1	1	1	0	0	0.0%	0.0%
0	Receiving Water	4	1	1	1	1	1	0	0	0.0%	0.0%
6.25		4	0.875	0.675	1	0.7	1	0.0629	0.126	14.4%	12.5%
12.5		4	0.925	0.773	1	0.8	1	0.0479	0.0957	10.4%	7.5%
25		4	0.975	0.895	1	0.9	1	0.025	0.05	5.13%	2.5%
50		4	1	1	1	1	1	0	0	0.0%	0.0%
100		4	1	1	1	1	1	0	0	0.0%	0.0%

Mean Dry Biomass-mg Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Moderately Soft	4	0.49	0.428	0.552	0.45	0.54	0.0196	0.0392	7.99%	0.0%
0	Receiving Water	4	0.545	0.507	0.583	0.53	0.58	0.0119	0.0238	4.37%	-11.2%
6.25		4	0.49	0.435	0.545	0.44	0.52	0.0173	0.0346	7.07%	0.0%
12.5		4	0.577	0.453	0.702	0.48	0.65	0.039	0.078	13.5%	-17.9%
25		4	0.653	0.592	0.713	0.6	0.68	0.0189	0.0377	5.79%	-33.2%
50		4	0.595	0.436	0.754	0.51	0.73	0.0499	0.0998	16.8%	-21.4%
100		4	0.605	0.487	0.723	0.51	0.69	0.0371	0.0742	12.3%	-23.5%

Mean Dry Weight-mg Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Moderately Soft	4	0.49	0.428	0.552	0.45	0.54	0.0196	0.0392	7.99%	0.0%
0	Receiving Water	4	0.545	0.507	0.583	0.53	0.58	0.0119	0.0238	4.37%	-11.2%
6.25		4	0.565	0.481	0.65	0.5	0.629	0.0266	0.0533	9.42%	-15.4%
12.5		4	0.625	0.522	0.728	0.55	0.7	0.0323	0.0645	10.3%	-27.6%
25		4	0.669	0.647	0.692	0.65	0.68	0.00712	0.0142	2.13%	-36.6%
50		4	0.595	0.436	0.754	0.51	0.73	0.0499	0.0998	16.8%	-21.4%
100		4	0.605	0.487	0.723	0.51	0.69	0.0371	0.0742	12.3%	-23.5%

Fathead Minnow 7-d Larval Survival and Growth Test — EnviroSystems, Inc.

7d Proportion Survived Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Moderately Soft	1	1	1	1
0	Receiving Water	1	1	1	1
6.25		1	0.7	0.9	0.9
12.5		0.9	1	1	0.8
25		1	1	1	0.9
50		1	1	1	1
100		1	1	1	1

Mean Dry Biomass-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Moderately Soft	0.54	0.47	0.5	0.45
0	Receiving Water	0.53	0.58	0.53	0.54
6.25		0.5	0.44	0.52	0.5
12.5		0.63	0.55	0.65	0.48
25		0.68	0.68	0.65	0.6
50		0.51	0.53	0.61	0.73
100		0.51	0.6	0.62	0.69

Mean Dry Weight-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Moderately Soft	0.54	0.47	0.5	0.45
0	Receiving Water	0.53	0.58	0.53	0.54
6.25		0.5	0.629	0.578	0.556
12.5		0.7	0.55	0.65	0.6
25		0.68	0.68	0.65	0.667
50		0.51	0.53	0.61	0.73
100		0.51	0.6	0.62	0.69

Fathead Minnow 7-d Larval Survival and Growth Test — **EnviroSystems, Inc.**

Analysis ID:	00-0133-4001	**Endpoint:**	7d Proportion Survived	**CETIS Version:**	CETISv1.8.6
Analyzed:	16 Mar-16 13:00	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Sample ID:	08-0736-5372	**Code:**	27001	**Client:**	ESS Laboratory
Sample Date:	08 Feb-16 08:00	**Material:**	Industrial Effluent	**Project:**	First Quarter WET Compliance Test
Receive Date:	08 Feb-16 13:35	**Source:**	Kendall Green Energy Facility		
Sample Age:	31h (1 °C)	**Station:**	Kendall Green Energy (MA0004898)		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	10.3%	100	>100	NA	1

Steel Many-One Rank Sum Test

Control	vs	C-%	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Receiving Water		6.25	12	10	1	6	0.1424	Asymp	Non-Significant Effect
		12.5	14	10	1	6	0.3451	Asymp	Non-Significant Effect
		25	16	10	1	6	0.6105	Asymp	Non-Significant Effect
		50	18	10	1	6	0.8333	Asymp	Non-Significant Effect
		100	18	10	1	6	0.8333	Asymp	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.1217103	0.02434206	5	2.5	0.0694	Non-Significant Effect
Error	0.1755187	0.009751039	18			
Total	0.297229		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Mod Levene Equality of Variance	2.56	4.25	0.0644	Equal Variances
Variances	Levene Equality of Variance	4.69	4.25	0.0065	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.832	0.884	0.0010	Non-normal Distribution

7d Proportion Survived Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Receiving Water	4	1	1	1	1	1	1	0	0.0%	0.0%
6.25		4	0.875	0.675	1	0.9	0.7	1	0.0629	14.4%	12.5%
12.5		4	0.925	0.773	1	0.95	0.8	1	0.0479	10.4%	7.5%
25		4	0.975	0.895	1	1	0.9	1	0.025	5.13%	2.5%
50		4	1	1	1	1	1	1	0	0.0%	0.0%
100		4	1	1	1	1	1	1	0	0.0%	0.0%

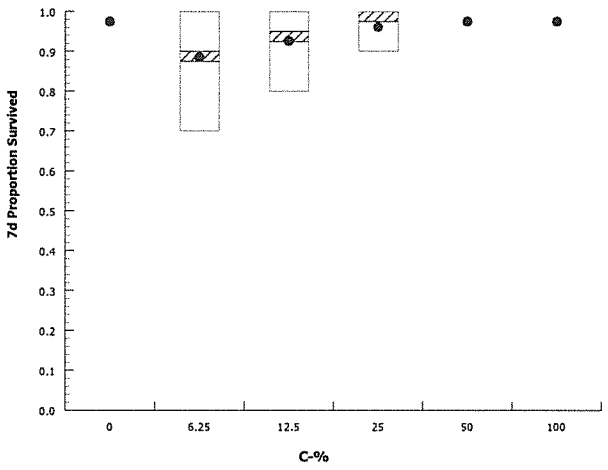
Angular (Corrected) Transformed Summary

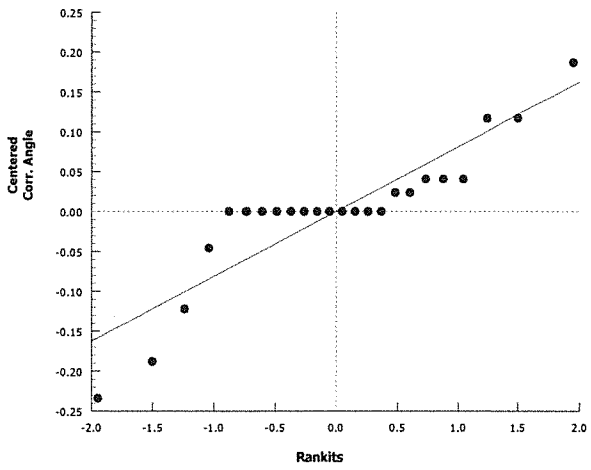
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Receiving Wate	4	1.41	1.41	1.41	1.41	1.41	1.41	0	0.0%	0.0%
6.25		4	1.23	0.948	1.5	1.25	0.991	1.41	0.087	14.2%	13.2%
12.5		4	1.3	1.06	1.53	1.33	1.11	1.41	0.0735	11.3%	8.28%
25		4	1.37	1.24	1.5	1.41	1.25	1.41	0.0407	5.94%	2.89%
50		4	1.41	1.41	1.41	1.41	1.41	1.41	0	0.0%	0.0%
100		4	1.41	1.41	1.41	1.41	1.41	1.41	0	0.0%	0.0%

Fathead Minnow 7-d Larval Survival and Growth Test — **EnviroSystems, Inc.**

Analysis ID:	00-0133-4001	**Endpoint:**	7d Proportion Survived	**CETIS Version:**	CETISv1.8.6
Analyzed:	16 Mar-16 13:00	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Graphics





Fathead Minnow 7-d Larval Survival and Growth Test — **EnviroSystems, Inc.**

Analysis ID:	14-8440-6994	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.8.6
Analyzed:	16 Mar-16 13:03	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Sample ID:	08-0736-5372	**Code:**	27001	**Client:**	ESS Laboratory
Sample Date:	08 Feb-16 08:00	**Material:**	Industrial Effluent	**Project:**	First Quarter WET Compliance Test
Receive Date:	08 Feb-16 13:35	**Source:**	Kendall Green Energy Facility		
Sample Age:	31h (1 °C)	**Station:**	Kendall Green Energy (MA0004898)		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C > T	NA	NA	20.1%	100	>100	NA	1

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Receiving Water		6.25	1.21	2.41	0.109	6	0.3327	CDF	Non-Significant Effect
		12.5	-0.716	2.41	0.109	6	0.9639	CDF	Non-Significant Effect
		25	-2.37	2.41	0.109	6	0.9997	CDF	Non-Significant Effect
		50	-1.1	2.41	0.109	6	0.9869	CDF	Non-Significant Effect
		100	-1.32	2.41	0.109	6	0.9930	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.06160002	0.01232	5	2.99	0.0390	Significant Effect
Error	0.07424997	0.004124999	18			
Total	0.13585		23			

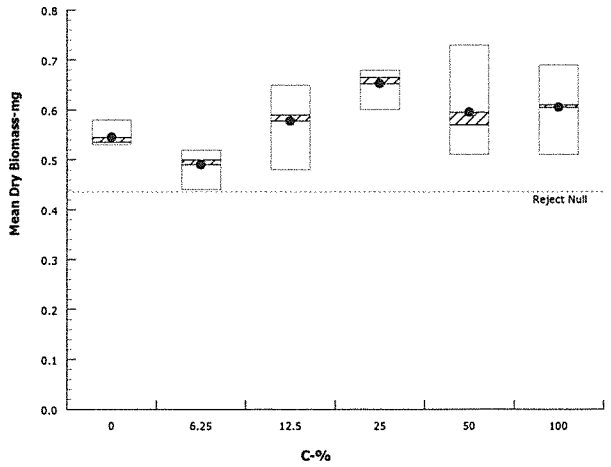
Distributional Tests

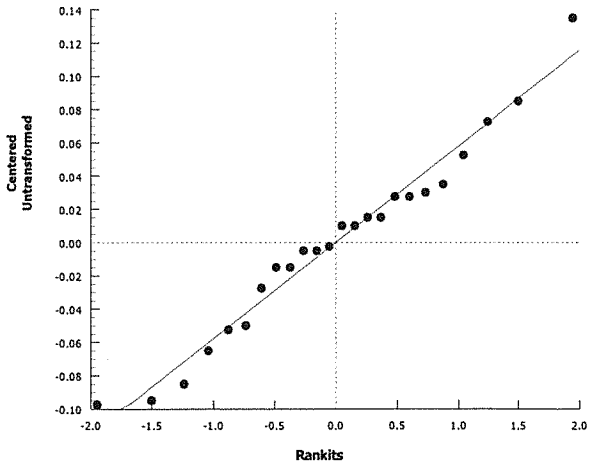
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	7.23	15.1	0.2040	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.972	0.884	0.7262	Normal Distribution

Mean Dry Biomass-mg Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Receiving Water	4	0.545	0.507	0.583	0.535	0.53	0.58	0.0119	4.37%	0.0%
6.25		4	0.49	0.435	0.545	0.5	0.44	0.52	0.0173	7.07%	10.1%
12.5		4	0.577	0.453	0.702	0.59	0.48	0.65	0.039	13.5%	-5.96%
25		4	0.653	0.592	0.713	0.665	0.6	0.68	0.0189	5.79%	-19.7%
50		4	0.595	0.436	0.754	0.57	0.51	0.73	0.0499	16.8%	-9.17%
100		4	0.605	0.487	0.723	0.61	0.51	0.69	0.0371	12.3%	-11.0%

Graphics





1300 Blue Spruce Drive, Suite C
Fort Collins, Colorado 80524

Toll Free: 800/331-5916
Tel: 970/484-5091 Fax:970/484-2514

02PpABS020916

ORGANISM HISTORY

DATE: 2/8/2016

SPECIES: *Pimephales promelas*

AGE: 1 day

LIFE STAGE: Larvae

HATCH DATE: 2/7/2016

BEGAN FEEDING: 2/8/2016

FOOD: *Artemia* sp.

Water Chemistry Record:	Current	Range
TEMPERATURE:	22°C	--
SALINITY/CONDUCTIVITY:	--	--
TOTAL HARDNESS (as $CaCO_3$):	120 mg/l	--
TOTAL ALKALINITY (as $CaCO_3$):	90 mg/l	--
pH:	8.18	--

Comments:

Facility Supervisor

FRESHWATER CHRONIC ASSAY - *C. dubia and P. promelas* NEW WATER QUALITIES

STUDY: 27001 CLIENT: ESS Laboratories SAMPLE: Effluent - Kendall Station DILUENT: Receiving Water

NEW DISSOLVED OXYGEN (mg/L)

CONC	REP	0	1	2	3	4	5	6	7
MSR	A	8.2	8.1	8.5	8.6	8.2	9.0	9.0	
RW	A	9.5	10.1	11.3	11.0	10.8	9.5	9.4	
6.25%	A	9.6	10.0	10.8	10.0	9.9	9.8	10.0	
12.5%	A	9.6	10.0	10.1	9.9	9.8	10.0	10.2	
25%	A	9.3	9.8	9.7	9.8	9.5	10.0	10.3	
50%	A	9.7	9.4	9.5	9.6	9.4	10.1	10.2	
100%	A	8.8	8.9	9.5	9.6	9.1	10.0	10.1	

NEW pH (SU)

0	1	2	3	4	5	6	7
7.72	7.74	7.72	7.48	7.58	7.82	7.85	
7.36	7.25	7.41	7.21	7.29	7.33	7.35	
7.30	7.25	7.41	7.24	7.32	7.32	7.33	
7.29	7.27	7.39	7.25	7.33	7.32	7.33	
7.28	7.28	7.38	7.27	7.33	7.30	7.32	
7.29 @ 25.0°C	7.30	7.37	7.29	7.33	7.28	7.29	
7.36	7.35	7.38	7.31	7.31	7.25	7.23	

NEW SPECIFIC CONDUCTIVITY (µMHOS/CM)

CONC	REP	0	1	2	3	4	5	6	7
MSR	A	205	195	198	192	195	200	195	
RW	A	1484	1473	1447	1378	1638	1648	1687	
6.25%	A	1498	1532	1467	1480	1726	1725	1716	
12.5%	A	1464	1489	1483	1478	1723	1722	1729	
25%	A	1436	1473	1499	1499	1714	1697	1712	
50%	A	1367	1796	1523	1508	1680	1682	1681	
100%	A	1090	1067	1562	1532	1639	1619	1620	
INC TEMP		26	25	25	25	25	25	26	
DATE:		02/09/16	2/10/16	02/11/16	02/12	02/13	02/14	02/15	
TIME:		1300	1320	1330	1250	1110	1220	1130	
INITIALS:		EB	[illegible]	HK	NP	NP	EH	EH	

NEW TEMPERATURE (°C)

0	1	2	3	4	5	6	7
21	21	22	20	19	21	21	
23	21	22	20	20	22	23	
23	21	19	21	20	22	23	
24	21	21	21	20	22	23	
24	21	21	21	20	22	23	
24	21	22	21	21	22	23	
24	21	19	21	21	22	23	

	DAY 0 (START)							DAY 2 (1ST RENEWAL)				DAY 4 (2ND RENEWAL)			
	METALS	TOC	ALK	HARD	AMM	TS/TDS	TRC	ALK	HARD	AMM	TRC	ALK	HARD	AMM	TRC
EFF							<0.02				<0.02				<0.02
RW															

Did 1st Renewal sample cause ≥50% mortality? Yes _____ No X
If "YES" put into circulation TOC and METALS bottles. _____

Did 2nd Renewal sample cause ≥50% mortality? Yes _____ No X
If "YES" put into circulation TOC and METALS bottles. _____

C. dubia Old Water Qualities

STUDY: 27001	CLIENT: ESS Laboratories					SAMPLE: Effluent - Kendall Station						DILUENT: RW	
CONC	DAY	pH	DO	TEMP	SPEC	CONC	DAY	pH	DO	TEMP	SPEC	INC TEMP	INIT
MSR	1	7.85	8.7	21	359	25%	1	7.71	8.5	21	1539	26	LB
	2	7.71	8.5	21	221		2	7.66	8.4	21	1537	26	BP
	3	8.04	8.6	21	236		3	7.81	8.3	21	1677	26	NP
	4	8.12	8.5	21	225		4	7.90	8.3	21	1661	25	DD
	5	8.24	9.3	20	217		5	7.89	9.4	20	1861	25	EH
	6	8.20	8.9	20	216		6	7.93	8.7	20	1873	25	EH
	7	7.75	8.7	22	215		7	7.67	8.6	22	1822	25	NP
	8						8						
RW	1	7.72	8.6	21	1554	50%	1	7.70	8.5	21	1459		
	2	7.63	8.5	21	1571		2	7.66	8.6	21	1423		
	3	7.83	8.5	21	1425		3	7.83	8.3	21	1792		
	4	7.87	8.3	22	1587		4	7.94	8.4	21	1691		
	5	8.01	9.4	20	1917		5	7.87	9.4	20	1876		
	6	7.92	8.8	20	1754		6	7.95	8.8	20	1851		
	7	7.60	8.6	22	1681		7	7.70	8.6	22	1791		
	8						8						
6.25%	1	7.71	8.6	21	1602	100%	1	7.73	8.5	21	1199		
	2	7.65	8.5	21	1643		2	7.67	8.4	21	1202		
	3	7.81	8.4	21	1572		3	7.82	8.4	21	1812		
	4	7.86	8.3	22	1647		4	8.01	8.6	21	1702		
	5	8.07	9.4	20	1835		5	7.88	9.3	20	1853		
	6	7.89	8.8	20	1872		6	8.02	8.8	20	1878		
	7	7.63	8.6	22	1786		7	7.71	8.6	22	1715		
	8						8						
12.5%	1	7.72	8.6	21	1582		1						
	2	7.65	8.4	21	1594		2						
	3	7.86	8.4	21	1617		3						
	4	7.87	8.3	21	1658		4						
	5	7.93	9.4	20	1863		5						
	6	7.92	8.8	20	1878		6						
	7	7.65	8.6	22	1812		7						
	8						8						

P. promelas CHRONIC ASSAY - OLD WATER QUALITIES

STUDY: 27001	CLIENT: ESS Laboratories	SAMPLE: Effluent	DILUENT: RW

OLD Temperature (°C)

CONC	REP	1	2	3	4	5	6	7
MSR	A	23	24	24	24	23	22	23
RW	A	23	24	24	24 (2/15)	23	23	23
6.25%	A	23	24	24	24	23	23	24
12.5%	A	23	24	24	24	23	23	24
25%	A	24	24	24	24	23	23	23
50%	A	24	24	24	24	24	24	23
100%	A	24	24	24	24	23	24	23

OLD pH (SU)

CONC	REP	1	2	3	4	5	6	7
MSR	A	7.88	7.57	7.40	7.54	7.34	7.50	7.54
RW	A	7.62	7.37	7.19	7.34	7.45	7.38	7.26
6.25%	A	7.65	7.37	7.21	7.35	7.43	7.40	7.31
12.5%	A	7.59	7.30	7.19	7.36	7.43	7.36	7.32
25%	A	7.58	7.41	7.21	7.41	7.34	7.40	7.41
50%	A	7.58	7.41	7.20	7.39	7.31	7.35	7.43
100%	A	7.58	7.43	7.20	7.39	7.40	7.30	7.34

OLD SPECIFIC CONDUCTIVITY (µMHOS/CM)

CONC	REP	1	2	3	4	5	6	7
MSR	A	219	227	216	221	202	285	251
RW	A	1532	15116	1501	1504	1647	16446	1741
6.25%	A	1609	1576	1554	1549	1720	1794	1817
12.5%	A	1634	1555	1575	1580	1740	1784	1832
25%	A	1571	14960	1546	1569	1731	1805	1841
50%	A	1420	1349	1532	1609	1705	1759	1894
100%	A	1145	1111	1525	1606	1602	1737	1740
INC TEMP:		26	25	25	25	25	25	25
DATE:		02/10/16	02/11	02/12	02/13	02/14	02/15	02/16
TIME:		1005	0945	1110	0630	0900	0845	0920
INITIALS:		NP	EH	NP	NP	EH	EH	EH

PREPARATION of DILUTIONS

STUDY: 27001 CLIENT: ESS Laboratories SAMPLE: Effluent - Kendall Station

SPECIES: *C. dubia* & *P. promelas* TEST: chronic renewal DILUENT: Receiving Water

START	Day: 0		Day: 1	
Diluent: RW	Sample: E_0, D_0		Sample: E0, D0	
Concentration	Vol Eff	Final Vol	Vol Eff	Final Vol
MSR	0	1200	0	1000
RW	0		0	
6.25%	75		625 ~~75~~	
12.5%	150		125 ~~150~~	
25%	300		250 ~~300~~	
50%	600		500 ~~600~~	
100%	1200		1000 ~~1200~~	

	Date / Time / Init	*Selenastrum*	YCT	Brine Shrimp
Day 0	02/09/16 1245 EB	A-4176	F119	A-4090
Day 1	2/10/16 1305 HK	A-4192	F119	A-4090
Day 2	02/11/16 1310 HK	A-4192	F119	A-4090
Day 3	02/12/16 1235 HK	A-4192	F119	A-4090
Day 4	02/13/16 1050 HK	A-4192	F119	A-4090
Day 5	02/14 1200 EH	A-4192	F119	A-4090
Day 6	02/15 1125 EH	A-4192	F119	A-4090
Day 7				

1st Renewal	Day: 2		Day: 3		Day:	
Diluent: RW	Sample: E_1, D_1		Sample: E_1, D_1		Sample:	
Concentration	Vol Eff	Final Vol	Vol Eff	Final Vol	Vol Eff	Final Vol
MSR	0	1000	0	1000		
RW	0		0			
6.25%	62.5		62.5			
12.5%	125		125			
25%	250		250			
50%	500		500			
100%	1000		1000			

Lab Water ID:	
Day 0	26988 w-989
Day 1	27065 w-992
Day 2	27065 w-992
Day 3	27065 w-992
Day 4	27065 w-992
Day 5	27065 w-992
Day 6	27065 w-992
Day 7	

2nd Renewal	Day: 4		Day: 5		Day: 6		Day:	
Diluent: RW	Sample: E_2, D_2		Sample: E2, D2		Sample: E2, D2		Sample:	
Concentration	Vol Eff	Final Vol	Vol Eff	Final Vol	Vol Eff	Final Vol	Vol Eff	Final Vol
MSR	0	1000	0	1000	0	1000		
RW	0		0		0			
6.25%	62.5		62.5		62.5			
12.5%	125		125		125			
25%	250		250		250			
50%	500		500		500			
100%	1000		1000		1000			

METER USE RECORD
FRESHWATER CHRONIC
C. dubia & P. promelas

STUDY: 27001	CLIENT: ESS Laboratories	SAMPLE: Effluent - Kendall Station

OLD WATER QUALITIES - *P. promelas*

	0	1	2	3	4	5	6	7	8
Water Quality Station #		1	2	1	1	2	2	2	
Initials		NP	EH	NP	NP	EH	EH	EH	

OLD WATER QUALITIES - *C. dubia*

	0	1	2	3	4	5	6	7	8
Water Quality Station #		2	1	1	1	1	2	2	
Initials		LB	BP	NP	DD	EH	EH	NP	

NEW WATER QUALITIES - Both Species

	0	1	2	3	4	5	6	7	8
Water Quality Station #	1	1	1	1	1	1	2		
Initials	EB	[illegible]	HK	NP	NP	EH	EH		
Date	02/09/16	2/10/16	2/11/16	2/12/16	2/13/16	02/14	02/15	02/16	

Water Quality Station #1		Water Quality Station #2		COMMENTS
DO meter #	24	DO meter #	23	
DO probe #	94	DO probe #	91	
pH meter #	1097	pH meter #	470	
pH probe #	138	pH probe #	139	
S/C meter #	YSI30D	S/C meter #	YSI30D	
S/C probe #	↓	S/C probe #	↓	

SAMPLE RECEIPT RECORD
FOR CHRONIC TOXICITY EVALUATIONS

STUDY #: 27001	CLIENT: ESS Laboratory

SAMPLE RECEIPT INFORMATION

	Start Sample	First Renewal	Second Renewal
Sample Receipt Date & Time:	02/08/16 1335	02/11/16 1200	02/12/16 1240
Received By:	JLH	KC	BG
Delivered Via:	Fed Ex UPS (Client) Courier ESI	Fed Ex UPS (Client) Courier ESI	Fed Ex UPS (Client) Courier ESI
Logged Into Lab By:	AC	NP	BG
Date &Time Logged In:	02/08/16 1355	02/11/16 1300	02/12/16 1545

SAMPLE CONDITION INFORMATION

	Start Sample	First Renewal	Second Renewal
Chain of Custody?	(Yes) or No	(Yes) or No	(Yes) or No
Chain of Custody Signed?	(Yes) or No	(Yes) or No	(Yes) or No
Chain of Custody Complete?	(Yes) or No	(Yes) or No	(Yes) or No
Sample Date?	(Yes) or No	(Yes) or No	(Yes) or No
Sample Time?	(Yes) or No	(Yes) or No	(Yes) or No
Sample Type?	(Yes) or No	(Yes) or No	(Yes) or No
Custody Seal in Place?	Yes (NA) No	Yes (NA) No	Yes (NA) No
Shipping Container Intact?	(Yes) or No	(Yes) or No	(Yes) or No
Temp Blank Temperature:	1.3 °C	1.8°C	0.7°C
DOES CLIENT NEED NOTIFICATION OF TEMP?	Yes or (No)	Yes or (No)	Yes or (No)
Sample Arrived on Ice?	(Yes) or No	(Yes) or No	(Yes) or No
COMMENTS:	See COC	See COC	See COC

P:\GENERAL PROJECTS\FORMS\LABFORMS\Sample Receipt Record - Chronic 2013.wpd

ESI

EnviroSystems, Inc.
1 Lafayette Road
Hampton, NH 03842

Voice: 603-926-3345
FAX: 603-926-3521

ESI Job No: 27001

CHAIN OF CUSTODY DOCUMENTATION

Client: ESS Laboratory	Contact: Joe Sirbak	Project Name: ESS Laboratory - Kendall Station	
Report to: Joe Sirbak	Address: 5 Avenue D	Project Number: P0604	Task: 0001
Invoice to: Joe Sirbak	Address: Hopkinton, MA 01748	Project Manager: Joe Sirbak	
Voice: 508-435-9244 x4720	Fax: 508-435-9912	email: Jsirbak@thielsch.com	ERR

Protocol: NPDES

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or com-posite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preser-vation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
001	Effluent Start	2/2/16	0900 0800	MNM	C	3	3750	P	4 C	Water	N	CDPP7DCR StartSample
002	Receiving Water Start	2/3/16	1045	MNM	G	6	3750	P	4 C	Water	N	CDPP7DCR StartDiluent

Relinquished By: _____ Date: 2/8/16 Time: 1335

Received By: _____ Date: 02/08/16 Time: 1335

Relinquished By: _____ Date: _____ Time: _____

Received at Lab By: _____ Date: _____ Time: _____

Comments: Marine chronic assays will be conducted if effluent PPT is >1 at time of collection.

1.3°C Sachets 07 PPT

COC Number: A1012885

Sample Delivery Group No: Jan 2016

Page _____ of _____

ESI EnviroSystems, Inc.
1 Lafayette Road
Hampton, NH 03842

Voice: 603-926-3345
FAX: 603-926-3521

ESI Job No: 27001

CHAIN OF CUSTODY DOCUMENTATION

Client: ESS Laboratory	Contact: Joe Sirbak	Project Name: ESS Laboratory - Kendall Station	
Report to: Joe Sirbak	Address: 5 Avenue D	Project Number: P0604	Task: 0001
Invoice to: Joe Sirbak	Address: Hopkinton, MA 01748	Project Manager: Joe Sirbak	
Voice: 508-435-9244 x4720	Fax: 508-435-9912	email: Jsirbak@thielsch.com	ERR

Protocol: NPDES

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or composite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preservation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
		2/9-2/10										
003	Effluent First Renewal	2/8-2/9	0815-0815	MNM	C	3	3750	P	4 C	Water	N	CDPP7DCR 1stRenewal Sample
004	Receiving Water First Renewal	2/11-2/10	1000	MNM	G	5	3750	P	4 C	Water	N	CDPP7DCR 1stRenewal Diluent

Relinquished By:	Date: 2/22/16 Time: 1200	Received By:	Date: 2/11/16 Time: 1200
Relinquished By:	Date: Time:	Received at Lab By:	Date: Time:

Comments: Marine chronic assays will be conducted if effluent PPT is >1 at time of collection.

1.8°C

COC Number: A1013007

Sample Delivery Group No: Feb 2016

Page of

ESI

EnviroSystems, Inc.
1 Lafayette Road
Hampton, NH 03842

Voice: 603-926-3345
FAX: 603-926-3521

ESI Job No: 27001

CHAIN OF CUSTODY DOCUMENTATION

Client: ESS Laboratory	Contact: Joe Sirbak	Project Name: ESS Laboratory - Kendall Station	
Report to: Joe Sirbak	Address: 5 Avenue D	Project Number: P0604	Task: 0001
Invoice to: Joe Sirbak	Address: Hopkinton, MA 01748	Project Manager: Joe Sirbak	
Voice: 508-435-9244 x4720	Fax: 508-435-9912	email: Jsirbak@thielsch.com	P.O.No: ' Quote No:044260

Protocol: NPDES

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or com-posite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preser-vation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
005	Effluent Second Renewal	2/11-2/12	1030-1030	MNM	C	4	3750	P	4 C	Water	N	CDPP7DCR 2ndRenewal Sample
006	Receiving Water Second Renewal	2/12/16	1005	MNM	G	6	3750	P	4 C	Water	N	CDPP7DCR 2ndRenewal Diluent

Relinquished By:	Date: 2/12/16 Time: 1240	Received By:	Date: Time:
Relinquished By:	Date: Time:	Received at Lab By: Bryan D Fabo	Date: 02/12/16 Time: 1240

Comments: Marine chronic assays will be conducted if effluent PPT is >1 at time of collection.

COC Number: A1013009

Sample Delivery Group No: Feb 2016	Page of

Assay Review Checklist

DATE IN: 02/08/16

DATE DUE:

STUDY#: 27001

CLIENT: ESS Kendall Station

PROJECT:

ASSAY: COPP7DCR

Project Paperwork Check for Completeness	Date	Initials	Comments
Day 0	02/09/16	BP	
Day 1	2/10	LB	
Day 2	02/11	BP	
Day 3	02/12	NP	
Day 4	2/13/16	DD	
Day 5	02/14	EH	
Day 6	02/15	EH	
Day 7	02/16	NP	
Day 8			

Analyst Data Review	Date	Initials	Comments
Chains of Custody Complete	02/16/16	EH	
Sample Receipt Complete	↓	↓	
Organism Culture Sheet(s)			
Bench Sheets Complete (dates, times, initials, etc...)			
Water Quality Data Complete			
TRC Values & Bottle Numbers	↓		
Daphnid Calculations Complete	02/16/16		
Weights Reported			
Assay Acceptability Review	02/16/16	↓	

Technical Report Review	Date	Initials	Comments
Statistical Analysis Complete	~~3/15/16~~ 3/14/16	LB	Cd- 25H id'd as ♂ ∴ removed from rep/ brood prod but retained for surv
Statistical Analysis Reviewed	3/16/16	NR	- 12.5I removed from stats; Pp- lab C only 9 orgs from start
Data Acceptability Review	3/15/16	LB	Cd-assay failed MSD, suggesting assay not sens. enough to detect sig resp
Supporting Chemistry Report	N/A		at permit limit. Rep data gen follow inv. dose-resp w/ greatest impact/
Draft Report	3/15/16	LB	variability in RW(dil) + 100% (not impacted by dil), indicating adverse
QA Audit/Review Complete	rev'd 4/11/16	LB	response. IC25 = 68.5%, which supports C NOEC = 50%. No rep in any rep H,
Final Report Reviewed	3/16/16	NR	possibly all ♂? Alt stats anal removing rep H from rep results
Final Report Printed - PDF	↓	↓	in C NOEC = 50% + MSD = 25.12 (w/in acceptable range). Data are prov. vali
Executive Summary / Chems Sent			
Report E-mailed / Faxed	3/16/16	NR	
Report Logged Out / Invoice Sent	↓	↓	
Report Scanned to Archive	↓	↓	

P:\GENERAL PROJECTS\FORMS\LABFORMS\$ Assay Review Checklist.wpd

ESS Laboratory

Division of Thielsch Engineering, Inc.

185 Frances Avenue,Cranston RI 02910-2211
Tel. (401)461-7181 Fax (401)461-4486
www.esslaboratory.com

CHAIN OF CUSTODY

ESS Lab # 1602181

Turn Time ___X___Standard Other_____

Regulatory State: **MA** RI CT NH NJ NY ME Other_____

Is this project for any of the following:(please circle)
MA-MCP Navy USACE CT DEP Other_____

Reporting Limits - _____NPDES_____

Electonic Deliverables Excel Access PDF

Co. Name: **Veolia Kendall**	Project #:	Project Name: **NPDES BIOASSAY**	
Contact Person: **James Harrison**	Proj. Location:		
Address: **265 First St.**	City , State: **Cambridge, MA**		PO #
Tel. 617-679-4803	email: James.harrison2@veolia		

ESS Lab ID	Date	Collection Time	Grab -G Composite-C	Matrix	Sample ID	Pres Code	# of Containers	Type of Container	Vol of Container	Analysis: Total Solids	Suspended Solids	Alkalinity	Specific Conductance	Ammonia	TOC	Cd, Cr, Pb, Cu, Zn, Ni, Al, Mg, Ca	Hardness	
1 2	2/7/16 TO2/8/16	0800 TO 0800	Comp	WW	Final Effluent	1	1	p	1000ML	x	x	x	x					
1 2	2/7/16 TO2/8/16	0800 TO 0800	Comp	WW	Final Effluent	3	1	P	500ML					x				
1 2	2/7/16 TO2/8/16	0800 TO 0800	Comp	WW	Final Effluent	3	2	V	40ML						x			
1 2	2/7/16 TO2/8/16	0800 TO 0800	Comp	WW	Final Effluent	4	1	P	500ML							x	x	

LB 2/9/16

Container Type: P-Poly G-Glass AG-Amber Glass S-Sterile V-VOA

Matrix: S-Soil SD-Solid D-Sludge WW-Wastewater GW-Groundwater SW-Surface Water DW-Drinking Water O-Oil W-Wipes F-Filter

Cooler Present ____x___Yes _____No

Seals Intact ____ Yes _____No NA:_x___

Cooler Temperature: 4.9°C ice 2/9/16 MMM

Internal Use Only

[ ] Pickup

[x] Technician_MM__

Preservation Code: 1-NP, 2-HCl, 3-H2SO4, 4-HNO3, 5-NaOH, 6-MeOH, 7-Asorbic Acid, 8-ZnAct, 9-_____

Sampled by : **Matt Miller-ESS Laboratory**

Comments:
pH: 7.45 s.u. @ 21.3C
Salinity: 0.7 PPT
TRC: 0.03
Diss. Oxygen: 6.93 mg/L

Relinquished by: (Signature, Date & Time)	Received by: (Signature, Date & Time)	Relinquished by: (Signature, Date & Time)	Received by: (Signature, Date & Time)
2/9/16 0840	Larisa Badger 2/9/16 1004		

* By circling MA-MCP, client acknowledges sampels were collected in accordance with MADEP CAM VIIA

Please fax to the laboratory all changes to Chain of Custody

Report Method Blank & Laboratory Control Sample Results

ESS Laboratory

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www.esslaboratory.com

CHAIN OF CUSTODY

ESS Lab # 1602181

Turn Time ___X___Standard Other_____

Regulatory State: **MA** RI CT NH NJ NY ME Other_____

Is this project for any of the following:(please circle)
MA-MCP Navy USACE CT DEP Other_____

Reporting Limits - _____NPDES_____

Electonic Deliverables Excel Access PDF

Co. Name: **Veolia Kendall**	Project #:	Project Name: **NPDES BIOASSAY**	
Contact Person: **James Harrison**	Proj. Location:		
Address: **265 First St.**	City , State: **Cambridge, MA**		PO #
Tel. 617-679-4803	email: James.harrison2@veolia		

ESS Lab ID	Date	Collection Time	Grab -G Composite-C	Matrix	Sample ID	Pres Code	# of Containers	Type of Container	Vol of Container	Analysis: Total Solids	Suspended Solids	Alkalinity	Specific Conductance	Ammonia	TOC	Cd, Cr, Pb, Cu, Zn, Ni, Al, Mg, Ca	Hardness	
2	2/8/16	1045	Grab	SW	Receiving Water	1	1	p	1000ML	x	x	x	x					
2	2/8/16	1045	Grab	SW	Receiving Water	3	1	P	500ML					x				
2	2/8/16	1045	Grab	SW	Receiving Water	3	2	V	40ML						x			
2	2/8/16	1045	Grab	SW	Receiving Water	4	1	P	500ML							x	x	

LB 2/9/16

Container Type: P-Poly G-Glass AG-Amber Glass S-Sterile V-VOA

Matrix: S-Soil SD-Solid D-Sludge WW-Wastewater GW-Groundwater SW-Surface Water DW-Drinking Water O-Oil W-Wipes F-Filter

Cooler Present ___x___Yes _____No

Seals Intact ____ Yes _____No NA:_x___

Cooler Temperature: 4.9°C ice mmm 2/9/16

Internal Use Only

[ ] Pickup

[x] Technician_MM__

Preservation Code: 1-NP, 2-HCl, 3-H2SO4, 4-HNO3, 5-NaOH, 6-MeOH, 7-Asorbic Acid, 8-ZnAct, 9-_____

Sampled by : **Matt Miller-ESS Laboratory**

Comments:
pH: 7.24 s.u. @ 3.2 C
Salinity: 0.7 PPT
TRC: 0.05
Diss. Oxygen: 11.50 mg/L

Relinquished by: (Signature, Date & Time)	Received by: (Signature, Date & Time)	Relinquished by: (Signature, Date & Time)	Received by: (Signature, Date & Time)
2/9/14 0840	Larisa Badger 2/9/16 1002		

* By circling MA-MCP, client acknowledges sampels were collected in accordance with MADEP CAM VIIA

Please fax to the laboratory all changes to Chain of Custody

Report Method Blank & Laboratory Control Sample Results

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CHAIN OF CUSTODY

ESS Lab # 1602181

Turn Time ___X___Standard Other_____

Regulatory State: **MA** RI CT NH NJ NY ME Other_____

Is this project for any of the following:(please circle)
MA-MCP Navy USACE CT DEP Other_____

Reporting Limits - _____NPDES_____

Electonic Deliverables Excel Access PDF

Co. Name: **Veolia Kendall**	Project #:	Project Name: **NPDES BIOASSAY**	
Contact Person: **James Harrison**	Proj. Location:		
Address: **265 First St.**	City , State: **Cambridge, MA**		PO #
Tel. 617-679-4803	email: James.harrison2@veolia		

ESS Lab ID	Date	Collection Time	Grab -G Composite-C	Matrix	Sample ID	Pres Code	# of Containers	Type of Container	Vol of Container	Analysis: Total Soilds	Suspended Solids	Alkalinity	Specific Conductance	Ammonia	TOC	Cd, Cr, Pb, Cu, Zn, Ni, Al, Mg, Ca	Hardness	
3	2/9/16 TO2/10/16	0815 TO 0815	Comp	WW	Final Effluent	1	1	p	1000ML	X	X	X	X					
3	2/9/16 TO2/10/16	0815 TO 0815	Comp	WW	Final Effluent	3	1	P	500ML					X				
3	2/9/16 TO2/10/16	0815 TO 0815	Comp	WW	Final Effluent	3	2	V	40ML						X			
3	2/9/16 TO2/10/16	0815 TO 0815	Comp	WW	Final Effluent	4	1	P	500ML							X	X	

Container Type: P-Poly G-Glass AG-Amber Glass S-Sterile V-VOA

Matrix: S-Soil SD-Solid D-Sludge WW-Wastewater GW-Groundwater SW-Surface Water DW-Drinking Water O-Oil W-Wipes F-Filter

Cooler Present ____x___Yes _____No

Seals Intact ____ Yes _____No NA:_x___

Cooler Temperature: 1.0°C 2/11/16 ice man

Internal Use Only

[ ] Pickup

[x] Technician_MM__

Preservation Code: 1-NP, 2-HCl, 3-H2SO4, 4-HNO3, 5-NaOH, 6-MeOH, 7-Asorbic Acid, 8-ZnAct, 9-_____

Sampled by : **Matt Miller-ESS Laboratory**

Comments:
pH: 7.51 s.u. @ 20.5C
Salinity: 0.6 PPT
TRC: 0.03
Diss. Oxygen: 7.00 mg/L

Relinquished by: (Signature, Date & Time)	Received by: (Signature, Date & Time)	Relinquished by: (Signature, Date & Time)	Received by: (Signature, Date & Time)
2/11/16 1505	2/11/16 1509		

* By circling MA-MCP, client acknowledges sampels were collected in accordance with MADEP CAM VIIA

Please fax to the laboratory all changes to Chain of Custody

Report Method Blank & Laboratory Control Sample Results

ESS Laboratory

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www.esslaboratory.com

CHAIN OF CUSTODY

ESS Lab # 1602181

Turn Time ___X___Standard Other_____

Regulatory State: **MA** RI CT NH NJ NY ME Other_____

Is this project for any of the following:(please circle)
MA-MCP Navy USACE CT DEP Other_____

Reporting Limits - _____NPDES_____

Electonic Deliverables Excel Access PDF

Co. Name: **Veolia Kendall**	Project #:	Project Name: **NPDES BIOASSAY**	
Contact Person: **James Harrison**	Proj. Location:		
Address: **265 First St.**	City , State: **Cambridge, MA**		PO #
Tel. 617-679-4803	email: James.harrison2@veolia		

ESS Lab ID	Date	Collection Time	Grab -G Composite-C	Matrix	Sample ID	Pres Code	# of Containers	Type of Container	Vol of Container	Analysis: Total Soilds	Suspended Solids	Alkalinity	Specific Conductance	Ammonia	TOC	Cd, Cr, Pb, Cu, Zn, Ni, Al, Mg, Ca	Hardness	
4	2/11/16	1000	Grab	SW	Receiving Water	1	1	p	1000ML	x	x	x	x					
4	2/11/16	1000	Grab	SW	Receiving Water	3	1	P	500ML					x				
4	2/11/16	1000	Grab	SW	Receiving Water	3	2	V	40ML						x			
4	2/11/16	1000	Grab	SW	Receiving Water	4	1	P	500ML							x	x	

Container Type: P-Poly G-Glass AG-Amber Glass S-Sterile V-VOA

Matrix: S-Soil SD-Solid D-Sludge WW-Wastewater GW-Groundwater SW-Surface Water DW-Drinking Water O-Oil W-Wipes F-Filter

Cooler Present ____x___Yes _____No

Seals Intact ____ Yes _____No NA:_x___

Cooler Temperature: 1.0°C ice MM 2/11/16

Internal Use Only

[ ] Pickup

[x] Technician_MM__

Preservation Code: 1-NP, 2-HCl, 3-H2SO4, 4-HNO3, 5-NaOH, 6-MeOH, 7-Asorbic Acid, 8-ZnAct, 9-_____

Sampled by : **Matt Miller-ESS Laboratory**

Comments:
pH: 7.32 s.u. @ 3.0 C
Salinity: 0.6 PPT
TRC: 0.06
Diss. Oxygen: 10.10 mg/L

Relinquished by: (Signature, Date & Time)	Received by: (Signature, Date & Time)	Relinquished by: (Signature, Date & Time)	Received by: (Signature, Date & Time)
2/11/16 1505	2/11/16 1509		
Relinquished by: (Signature, Date & Time)	Received by: (Signature, Date & Time)	Relinquished by: (Signature, Date & Time)	Received by: (Signature, Date & Time)

* By circling MA-MCP, client acknowledges sampels were collected in accordance with MADEP CAM VIIA

Please fax to the laboratory all changes to Chain of Custody

Report Method Blank & Laboratory Control Sample Results

1.13

ESS Laboratory

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CHAIN OF CUSTODY

ESS Lab # 1602181

Turn Time __X__Standard Other________

Regulatory State: **MA** RI CT NH NJ NY ME Other______

Is this project for any of the following:(please circle)
MA-MCP Navy USACE CT DEP Other________

Reporting Limits - ______NPDES________

Electonic Deliverables Excel Access PDF

Co. Name: **Veolia Kendall**
Project #:
Project Name: **NPDES BIOASSAY**
Contact Person: **James Harrison**
Proj. Location:
Address: **265 First St.**
City, State: **Cambridge, MA**
PO #:
Tel. 617-679-4803
email: James.harrison2@veolia

ESS Lab ID	Date	Collection Time	Grab -G Composite-C	Matrix	Sample ID	Pres Code	# of Containers	Type of Container	Vol of Container	Total Solids	Suspended Solids	Alkalinity	Specific Conductance	Ammonia	TOC	Cd, Cr, Pb, Cu, Zn, Ni, Al, Mg, Ca	Hardness
5	2/11/16 TO2/12/16	1030 TO 1030	Comp	WW	Final Effluent	1	1	p	1000ML	x	x	x	x				
5	2/11/16 TO2/12/16	1030 TO 1030	Comp	WW	Final Effluent	3	1	P	500ML					x			
5	2/11/16 TO2/12/16	1030 TO 1030	Comp	WW	Final Effluent	3	2	V	40ML						x		
5	2/11/16 TO2/12/16	1030 TO 1030	Comp	WW	Final Effluent	4	1	P	500ML							x	x

Container Type: P-Poly G-Glass AG-Amber Glass S-Sterile V-VOA

Matrix: S-Soil SD-Solid D-Sludge WW-Wastewater GW-Groundwater SW-Surface Water DW-Drinking Water O-Oil W-Wipes F-Filter

Cooler Present ____x___Yes _____No

Seals Intact ____ Yes _____No NA:_x___

Cooler Temperature: 1.0°C ice Mm 2/12/16

Internal Use Only

[ ] Pickup

[x] Technician_MM__

Preservation Code: 1-NP, 2-HCl, 3-H2SO4, 4-HNO3, 5-NaOH, 6-MeOH, 7-Asorbic Acid, 8-ZnAct, 9-_____

Sampled by : **Matt Miller-ESS Laboratory**

Comments:
pH: 7.46 s.u. @ 10.5C
Salinity: 0.8 PPT
TRC: 0.18
Diss. Oxygen: 7.78 mg/L

Relinquished by: (Signature, Date & Time)	Received by: (Signature, Date & Time)	Relinquished by: (Signature, Date & Time)	Received by: (Signature, Date & Time)
2/12/16 1650	2/12/16 1707		
Relinquished by: (Signature, Date & Time)	Received by: (Signature, Date & Time)	Relinquished by: (Signature, Date & Time)	Received by: (Signature, Date & Time)

* By circling MA-MCP, client acknowledges sampels were collected in accordance with MADEP CAM VIIA

Please fax to the laboratory all changes to Chain of Custody

Report Method Blank & Laboratory Control Sample Results

ESS Laboratory

Division of Thielsch Engineering, Inc.

185 Frances Avenue,Cranston RI 02910-2211
Tel. (401)461-7181 Fax (401)461-4486
www.esslaboratory.com

CHAIN OF CUSTODY

ESS Lab # 1602181

Turn Time ___X___Standard Other_____

Regulatory State: **MA** RI CT NH NJ NY ME Other_____

Is this project for any of the following:(please circle)
MA-MCP Navy USACE CT DEP Other_____

Reporting Limits - _____NPDES_____

Electonic Deliverables Excel Access PDF

Co. Name	Project #	Project Name
Veolia Kendall		**NPDES BIOASSAY**

Contact Person	Proj. Location
James Harrison	

Address	City , State		PO #
265 First St.	**Cambridge, MA**		

Tel.	email:
617-679-4803	James.harrison2@veolia

ESS Lab ID	Date	Collection Time	Grab -G Composite-C	Matrix	Sample ID	Pres Code	# of Containers	Type of Container	Vol of Container	Analysis: Total Solids	Suspended Solids	Alkalinity	Specific Conductance	Ammonia	TOC	Cd, Cr, Pb, Cu, Zn, Ni, Al, Mg, Ca	Hardness	
6	**2/12/16**	**1005**	**Grab**	**SW**	**Receiving Water**	**1**	**1**	**p**	**1000ML**	**x**	**x**	**x**	**x**					
6	**2/12/16**	**1005**	**Grab**	**SW**	**Receiving Water**	**3**	**1**	**P**	**500ML**					**x**				
6	**2/12/16**	**1005**	**Grab**	**SW**	**Receiving Water**	**3**	**2**	**V**	**40ML**						**x**			
6	**2/12/16**	**1005**	**Grab**	**SW**	**Receiving Water**	**4**	**1**	**P**	**500ML**							**x**	**x**	

Container Type: P-Poly G-Glass AG-Amber Glass S-Sterile V-VOA

Matrix: S-Soil SD-Solid D-Sludge WW-Wastewater GW-Groundwater SW-Surface Water DW-Drinking Water O-Oil W-Wipes F-Filter

Cooler Present ____x___Yes _____No

Seals Intact ____ Yes _____No NA:_x___

Cooler Temperature: 1.0°C ice blank 2/12/16

Internal Use Only

[ ] Pickup

[x] Technician_MM__

Preservation Code: 1-NP, 2-HCl, 3-H2SO4, 4-HNO3, 5-NaOH, 6-MeOH, 7-Asorbic Acid, 8-ZnAct, 9-_____

Sampled by : **Matt Miller-ESS Laboratory**

Comments:
pH: 7.82 s.u. @ 1.2 C
Salinity: 0.8 PPT
TRC: 0.20
Diss. Oxygen: 11.21 mg/L

Relinquished by: (Signature, Date & Time)	Received by: (Signature, Date & Time)	Relinquished by: (Signature, Date & Time)	Received by: (Signature, Date & Time)
2/12/16 1650	2/12/16 1707		
Relinquished by: (Signature, Date & Time)	Received by: (Signature, Date & Time)	Relinquished by: (Signature, Date & Time)	Received by: (Signature, Date & Time)

* By circling MA-MCP, client acknowledges sampels were collected in accordance with MADEP CAM VIIA

Please fax to the laboratory all changes to Chain of Custody

Report Method Blank & Laboratory Control Sample Results

ESI

EnviroSystems, Inc.
1 Lafayette Road
Hampton, NH 03842

Voice: 603-926-3345
FAX: 603-926-3521

ESI Job No: 3 of 3 1602181

CHAIN OF CUSTODY DOCUMENTATION

Client: ESS Laboratory	Contact: Joe Sirbak	Project Name: ESS Laboratory - Kendall Station	
Report to: Joe Sirbak	Address: 5 Avenue D	Project Number: P0604	Task: 0001
Invoice to: Joe Sirbak	Address: Hopkinton, MA 01748	Project Manager: Joe Sirbak	
Voice: 508-435-9244 x4720	Fax: 508-435-9912	email: Jsirbak@thielsch.com	P.O.No: ' Quote No:044260

Protocol: NPDES

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or com-posite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preser-vation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
005	Effluent Second Renewal	2/11-2/12	1030-1030	MNA	C	4	3750	P	4 C	Water	N	CDPP7DCR 2ndRenewal Sample
006	Receiving Water Second Renewal	2/12/16	1005	MNA	G	6	3750	P	4 C	Water	N	CDPP7DCR 2ndRenewal Diluent

Relinquished By: [signature]	Date: 2/12/16	Time: 1240	Received By: Date: Time:
Relinquished By:	Date:	Time:	Received at Lab By: [signature] Date: 02/12/16 Time: 1240

Comments: Marine chronic assays will be conducted if effluent PPT is >1 at time of collection.

COC Number: A1013009

Sample Delivery Group No: Feb 2016

Page of